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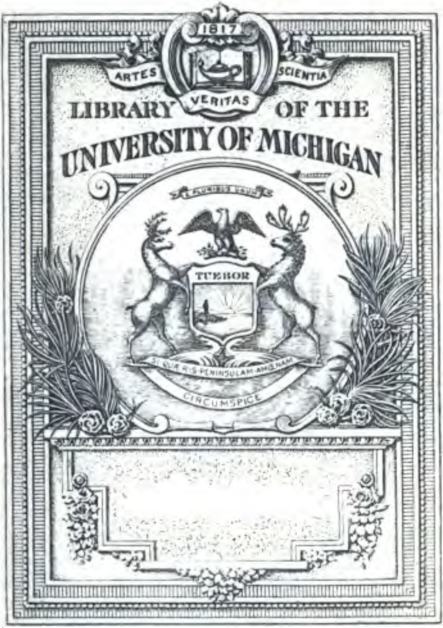

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A
Short PRACTICAL TREATISE
OF
ARITHMETIC.

By The Revd. R. BARNES
BARNARDCASTLE.

STOCKTON upon TEES;
PRINTED *by* C. HELTUS,
1793.

+	*mark*	of Addition.
−	-	of Subtraction.
×	-	of Multiplication.
÷	-	of Diviſion.
=	-	of Equality.
: :: :	-	of Proportion.

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ARITHMETIC.

1 ARITHMETIC is the Art of computing by Numbers, and conſiſts of two parts; viz. whole Numbers, and Fractions Vulgar or Decimal.

2 Arithmetic in whole Numbers ſuppoſes its Numbers to be entire Quantities, and not divided into parts, as 20l. 44 cwt.

3 Arithmetic in Fractions ſuppoſes its numbers to be parts of ſome whole Quantity, as ¼ of a £ ½ of a Ton, &c.

4 An Integer is any whole thing or ſingle figure.

5 Digits or figures are the Marks by which Numbers are expreſſed, and are the Nine following, viz. 1, 2, 3, 4, 5, 6, 7, 8, 9, to which we may add the Cipher 0, which is of no Value, when taken by itſelf, yet when placed on the right or left hand of any figure, it increaſes or diminiſhes it tenfold.

6 The principal or fundamental Rules of Arithmetic are five; viz. *Notation* or *Numeration, Addition, Subtraction, Multiplication* and *Diviſion.*

NOTATION or NUMERATION.

NUMERATION is the art of expreſſing Numbers or Figures, and teaches us to read or write ~~any Number, and to have a~~ clear and diſtinct idea of every Figure in it.

The TABLE.

Units	7
Tens	5
Hundreds	3
Thouſands	1
Tens of Thouſands	2
Hundreds of Thouſands	4
Millions	6
Tens of Millions	8
Hundreds of Millions	9
Thouſands of Millions	7
Tens of Thouſands of Millions	5
Hundreds of Thouſands of Millions	3
Billions	2
Tens of Billions	1
Hundreds of Billions	9
Thouſands of Billions	8
Tens of Thouſands of Billions	7
Hundreds of Thouſands of Billions	6
Trillions	5
Tens of Trillions	4
Hundreds of Trillions	3

SIMPLE ADDITION.

SIMPLE Addition is a Rule by which ſeveral Numbers of one Denomination are collected together into one Sum.

EXAMPLES.

1 Collect 371434, 278949375, 67149, 3457143, 714934, 9000987, and 5734747, into one Sum.

2 Add 571493, 40007, 6493497, 4718349, 3714934, 4934938, 174934, and 147349 together.

3 Suppoſe the Diſtance from London to Biggleſwade be 45 Miles, thence to Peterborough 36, thence to Lincoln 51, and thence to Hull 41 Miles; how many Miles are Peterborough, Lincoln and Hull from London?

SIMPLE SUBTRACTION.

SIMPLE Subtraction teaches to deduct or ſubtract, a leſs Number from a greater, of the ſame Denomination; whereby the Remainder or Difference is found.

EXAMPLES.

4 From 5007149 take 171493.

5 From 1493487 take 149349.

6 From the Creation to the Flood was 1656 years; thence to the Building of Solomon's Temple 1336 years; thence to Mahomet, who lived 622 years after Chriſt, 1630. In what year of the World was Chriſt then born, and how many years is it ſince the Creation?

SIMPLE MULTIPLICATION.

1 SIMPLE Multiplication is a Rule by which we encreaſe the greater of two given Numbers, of the ſame Denomination, as often as there are Units in the leſs.

2 The Number to be multiplied is called the *Multiplicand*; the Number you multiply by is called the *Multiplier*; and the Number produced by Multiplication is called the *Product*.

MULTIPLICATION TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3		9	12	15	18	21	24	27	30	33	36
4			16	20	24	28	32	36	40	44	48
5				25	30	35	40	45	50	55	60
6					36	42	48	54	60	66	72
7						49	56	63	70	77	84
8							64	72	80	88	96
9								81	90	99	108
10									100	110	120
11										121	132
12											144

RULE for MULTIPLYING.

BEGIN at the Unit's Place of the Multiplicand and multiply each Figure in it by every Figure in the Multiplier, writing down the whole of ſuch Products as are leſs than ten; but for ſuch as exceed ten or a Number of tens, write down the Exceſs, and carry an Unit for each ten to the next Product; obſerving to place the firſt Figure of every Product exactly under the Figure you multiply by, and the Sum of the Products will be the whole Product.

EXAMPLES.

Multiply 4708714371 by 9.
Multiply 3715714936 by 11.
Multiply 149371574 by 12.
7. Multiply 7493456 by 63.
8. Multiply 3175493 by 77.
9. Multiply 71340987 by 96.
10. Multiply 47154734 by 132.
11. Multiply 4307149304 by 743.
12. Multiply 3704957 by 4713759.
13. Multiply 5417080574 by 3905008.
14. Multiply 57867000 by 40075000.
15. Multiply 5719070 by 1440.
16. Required the Sum of 157 added 495 Times to itſelf.
17. Let 954 be added 435 Times to itſelf and ſhew what the laſt Sum total exceeds, or falls ſhort of, four hundred and fifteen thouſand.
18. Required the Product of eleven thouſand, eleven hundred and eleven, by twelve thouſand, twelve hundred and twelve.
What is the Difference between thrice ſix and twenty, and thrice twenty ſix ?

SIMPLE DIVISION.

1 SIMPLE Diviſion is a Rule by which we find how often one Number is contained in another of the ſame Denomination.

2 The Number to be divided is called the *Dividend*, the Number you divide by is called the *Diviſor*, and hence will ariſe a third Number called the *Quotient*, which ſhews how often the Diviſor is contained in the Dividend: If the Diviſor does not exactly meaſure the Dividend a fourth Number will occur, called the *Remainder*, which muſt always be leſs than the Diviſor.

RULE.

FIND how many Times the Diviſor may be had in one, two or as many Figures of the Dividend as are juſt neceſſary; multiply the Diviſor by the Quotient Figure, ſubſtract the Product from that part of the Dividend which ſtands above it, and to the right hand of the Remainder bring down the next figure in the Dividend, which Number divide as before, and ſo on till all the Figures in the Dividend are brought down.

EXAMPLES.

1. Divide 493740075 by 7.
2. Divide 30871050743 by 8.
3. Divide 41375714937 by 9.
4. Divide 37407184374 by 11.
5. Divide 47105713475 by 12.
6. Divide 749347549 by 144.
7. Divide 47307154 05 by 121.
8. Divide 4710437154 by 132.
9. Divide 1071540075 by 99.

10. Divide 714394756 by 1754.
11. Divide 571943007145 by 37149.
12. Divide 6754371495671594 by 678957.
13. Divide 571436400075 by 36500.
14. Divide 1071491471430715 by 147500.
15. The Sum of two Numbers is 348 and their Difference 194; required the Numbers.
16. Required the Difference between ſix Dozen Dozen, and half a Dozen Dozen?
17. Subtract 759 out of 171493745 as often as you can, and ſhew what the laſt Remainder exceeds or falls ſhort of 500.

TABLES of ENGLISH COIN,

WEIGHTS, MEASURES, &c.

TABLE I. Money

The loweſt Piece of Money, uſed in England, is a Farthing, and all Accounts are kept in Pounds, Shillings, Pence and Farthings.

2 Farthings	*make*	1 Halfpenny
4 Farthings	- -	1 Penny
6 Pence	- -	Half a Shilling
12 Pence	- -	1 Shilling
2 Shillings and 6 Pence		Half a Crown
5 Shillings	- -	1 Crown
5 Shillings and 3 Pence		A quarter of a guinea
10 Shillings and 6 Pence		Half a Guinea
21 Shillings	- -	1 Guinea [Coin.)
20 Shillings	- -	1 Pound (an imaginary

NOTE.

L. denotes Pounds, *S.* Shillings, and *D.* Pence.

¼ denotes a Farthing, or a quarter of any thing
½ - a Halfpenny, or the half of any thing
¾ three farthings, or three quarters of any thing

IMAGINARY ENGLISH COIN.

A Mark, value 13s. 4d. -	An Angel 10s.
A Noble 6s. 8d. -	A Carolus 23s.
A Groat 4d. - -	A Jacobus 25s.

SHILLINGS and PENCE TABLES.

		L.	*S.*			*L.*	*S.*
20	Shillings	1	0	130	Shillings	6	10
30	-	1	10	140	-	7	0
40	-	2	0	150	-	7	10
50	-	2	10	160	-	8	0
60	-	3	0	170	-	8	10
70	-	3	10	180	-	9	0
80	-	4	0	190	-	9	10
90	-	4	10	200	-	10	0
100	-	5	0	210	-	10	10
110	-	5	10	220	-	11	0
120	-	6	0	230	-	11	10

	S.	D.		S.	D.
20 Pence	1	8	54 Pence	4	6
30 -	2	6	80 -	6	8
40 -	3	4	84 -	7	0
24 -	2	0	90 -	7	6
36 -	3	0	96 -	8	0
48 -	4	0	100 -	8	4
50 -	4	2	108 -	9	0
60 -	5	0	110 -	9	2
70 -	5	10	120 -	10	0
72 -	6	0	130 -	10	10
76 -	6	4	132 -	11	0
89 -	7	5	144 -	12	0

II. TROY WEIGHT.

By this Weight are weighed Gold, Silver, Jewels, Amber, and all Liquors.

24 Grains	*make* -	1 Penny weight. dwt.
20 Penny weights	-	1 Ounce. oz.
12 Ounces	- - -	1 Pound. lb.

III. APOTHECARIES WEIGHT.

Apothecaries, Chemiſts, &c. uſe this Weight in mixing Medicines; but buy and ſell their Drugs by Avoirdupois Weight.

20 Grains	*make*	1 Scruple ℈
3 Scruples	-	1 Dram ʒ
8 Drams	-	1 Ounce ℥
12 Ounces	-	1 Pound lb.

IV.

IV. AVOIRDUPOIS WEIGHT.

By Avoirdupois Weight are weighed ſuch Commodities as are coarſe and droſſy or ſubject to waſte, as Groceries of all kinds, Bread, Butter, Cheeſe, and moſt other common Neceſſaries of Life; Pitch, Tar, Roſin, Wax, Tallow, Flax, &c. as are likewiſe all Metals, (except Gold and Silver.)

16 Drams *make* 1 Ounce.
16 Ounces - *1 Pound.*
28 Pounds - 1 Quar. of an hun. weight.
4 Quarters or 112 lb. 1 Hundred Weight. Cwt.
20 Cwt - 1 Ton.

There are ſeveral ſorts of Silks weighed by the great Pound of 24 Ounces, others by the common Pound of 16 Ounces, hence to reduce great Pounds to common, multiply by 3 and divide by 2, and to bring common Pounds into great, multiply by 2 and divide by 3.

NOTE. A Pound Avoirdupois is equal to 14 oz. 11 dwts. 15½ grs. Troy. Hence the Avoirdupois Pound is to the Troy Pound as 6999½ is to 5760.

A Firkin of Butter 56lb.
———— Soap 64lb.
A Barrel of Raiſins 112lb.
————Soap 256lb.
A Puncheon of Prunes 1120lb.
A Fother of Lead 19½ Cwt. or 2184lb.

A Stone, Horſeman's Weight, 14lb.
—— of Butcher's Meat, in London 8lb.
—— Ditto, in the Country 14lb.
A Gallon of Train Oil, 7½lb.
A Truſs of Straw, 36lb.
———— New Hay, 60lb.
———— Old Hay, 56lb.
A Load 36 Truſſes.
A Peck Loaf *Weighs* 17lb. 6 oz. 1dr.
A Half Peck —— 8lb. 11 oz.
A Quartern —— 4lb. 5 oz. 8drs.

WOOL WEIGHT.

A Clove or half Stone 7lb.
A Stone or 2 Cloves 14lb.
2 Stones or 1 Todd 28lb.
A Wey or 6½ Todds 182lb.
A Sack or two Weys 364lb.
A Laſt or 12 Sacks 4368lb.

V. CLOTH MEASURE.

Cloth Meaſure is uſed by Linen and Woolen Drapers. Hollands are meaſured by the Engliſh Ell, and Tapeſtry by the Flemiſh Ell; Woolens, Linens, wrought Silks, Tape, &c. by the Yard.

2¼ Inches *make* 1 Nail.
4 Nails - 1 Quarter of a Yard.
3 Quarters - 1 Flemiſh Ell.
4 Quarters - 1 Yard.
5 Quarters - 1 Engliſh Ell.
6 Quarters - 1 French Ell.

VI. LONG MEASURE.

This Meaſure is uſed to meaſure Diſtances, Lengths, Breadths, Height, Depths, &c. of Places or Things.

12 Lines or 3 barley corns	*make*	1 Inch.
12 Inches	- -	1 Foot.
3 Feet	- - -	1 Yard.
6 Feet, or 2 Yards	-	1 Fathom.
5½ Yards, or 11 half Yards		1 Rod, pole or perch
4 Poles, or 100 Links	-	1 Chain.
40 Poles, or 10 Chains	-	1 Furlong.
8 Furlongs, or 80 Chains		1 Mile.
3 Miles	- -	1 League.
60 Geographial Miles, or 69½ Statute Miles	-	1 Degree.

NOTE. The Statute Pole is 5½ Yards, but in ſome Counties in England they reckon 6 Yards to the Pole, in the North of England 7 Yards are accounted a Rod or Pole.

VII. SQUARE MEASURE.

Square Meaſure is uſed to meaſure all kinds of Superficies; ſuch as Land, Paving, Flooring, Plaſtering, Roofing, Slating, Tiling, and every thing that has Length and Breadth.

Square.		*Square.*
144 Inches	*make*	1 Foot.
9 Feet	-	1 Yard.
30¼ Yards	-	1 Rod, Pole or Perch.
16 Poles	-	1 Chain.

Sqnare.		*Square.*
40 Poles	*make*	1 Rood
4 Roods, or 160 Rods, or 4840 yards, or 10 chains		1 Acre.
640 Acres	-	1 Mile.
100 Feet	-	1 of Flooring.

VIII. CUBIC or SOLID MEASURE.

Is uſed in Menſuration to meaſure all kinds of Solids; or ſuch Figures as conſiſt of three Dimenſions, viz. Length, Breadth, and Depth or Thickneſs.

Cubic		*Cubic.*
1728 Inches	*make*	1 Foot.
27 Feet	- -	1 Yard.
166⅜ Yards	- -	1 Pole.
64000 Poles	- -	1 Furlong.
512 Furlongs	-	1 Mile.
40 Feet of rough Timber, or 50 Feet of hewn timber		1 Ton or Load

IX. WINE MEASURE.

By this Meaſure, all Wines, Brandies, Rum, Spirits, diſtilled Liquors, Cider, Perry, Mead, Vinegar, Honey, Oil, &c. are meaſured, Bought and Sold.

*4 Gills	*make*	1 Pint.
2 Pints	- -	1 Quart.
4 Quarts or 2 Pottles	- -	1 Gallon.

*NOTE. In the North of England a Gill is half a Pint; alſo the Meaſure of a Gill in London, is there called a Jack.

10 Gallons	*make*	1 Anchor of Brandy.
18 Gallons	-	1 Runlet.
31½ Gallons	-	1 Barrel or half hog.
42 Gallons	-	1 Tierce.
63 Gallons	-	1 Hogſhead.
84 Gallons	-	1 Puncheon.
2 Hogſheads or 126G.		1 Pipe or Butt.
2 Butts or 4 Hogſheads or 252 Gal.		1 Tun.

X. ALE and BEER MEASURE in LONDON.

By this Meaſure all Malt Liquors are gauged, bought and ſold.

2 Pints	*make*	1 Quart.
4 Quarts	-	1 Gallon.
8 Gallons	-	1 Firkin of Ale.
9 Gallons	-	1 Firkin of Beer.
2 Firkins or 18 Gal.		1 Kilderkin.
32 Gallons	-	1 Barrel of Ale.
36 Gallons	-	1 Barrel of Beer.
48 Gallons	-	1 Hogſhead of Ale.
54 Gallons	-	1 Hogſhead of Beer.
2 Hogſheads or 96 gal.		1 Butt of Ale.
2 Hogſheads or 108 G.		1 Butt of Beer.

NOTE The above Meaſure is uſed only in London for gauging and ſelling; in all other Parts of England, the following Table is the Standard of Ale and Beer Meaſure according to a Statute of Exciſe made in the Year 1689.

XI. ALE and BEER MEASURE in the COUNTRY.

2	Pints	*make*	1	Quart.
282	Cubic Inches or 4 Quarts.		1	Gallon.
8½	Gallons	-	1	Firkin.
17	Gallons	-	1	Kilderkin.
34	Gallons	-	1	Barrel.
51	Gallons	-	1	Hogſhead.

NOTE. Notwithſtanding the above Statute common Brewers in ſome parts of the Country, allow 36 Gallons to the Publicans for a Barrel of Ale and Beer.

XII. DRY MEASURE.

2	Pints	*make*	1	Quart.
2	Quarts	-	1	Pottle.
2	Pottles or 8 Pints	-	1	Gallon.
2	Gallons	-	1	Peck.
4	Pecks	-	1	Buſhel.
4	Buſhels	-	1	Coom.
2	Cooms, or 8 Buſhels		1	Quarter.
4	Quarters	-	1	Chaldron.
5	Quarters	-	1	Wey.
2	Weys, or 10 Quarters		1	Laſt.

For COALS.

4	Pecks	*make*	1	Buſhel.
3	Buſhels	-	1	Sack.
36	Buſhels or 12 Sacks		1	Chaldron.
21	Chaldrons	- -	1	Score.

NOTE. 32 Buſhels make a Chaldron in the Country: 5 Pecks make a Buſhel, Water Mea-

Meaſure: 5 Buſhels make a Sack of Flour. The Standard Wincheſter Buſhel is a Cylinder of 18½ Inches Diameter and 8 Inches in Depth.

XIII. MEASURE of TIME.

60 Thirds *make* 1 Second.
60 Seconds - 1 Minute.
60 Minutes - 1 Hour.
24 Hours - 1 Day.
7 Days - - 1 Week.
4 Weeks - 1 Month.

13 Months, 1 Day; or 52 Weeks 1 Day or 365 Days, a Year, for three Years together: but every fourth Year contains 366 days and is called Leap Year; hence the Julian Year is 365 Days 6 Hours at a Mean.

The common Year is alſo divided into 12 Calendar Months, viz. January, February, March, April, May, June, July, Auguſt, September, October, November, December.

MEMORANDUM.

Thirty days hath September,
April, June, *and* November:
February *hath twenty-eight alone,*
And all the reſt have thirty-one.

In Leap Year, which happens every fourth Year, February has twenty-nine Days.

To know when it is Leap Year, divide the Year by four, and the Remainder ſhews how long it is after Leap Year; if Nothing remains, it is Leap Year.

XIV

XIV. OF NUMBER.

12	Units	*make*	1	Dozen.
12	Dozens	-	1	Groſs.
12	Groſs or 144doz.		1	Great Groſs.
20	Units	-	1	Score.
5	Scores	-	1	Hundred.
6	Scores	-	1	Long Hundred.
24	Sheets	-	1	Quire of Paper.
20	Quires	-	1	Ream of paper or parch.
2	Reams	-	1	Bundle of ditto.
12	Skins of Parch.		1	Roll.

COMPOUND ADDITION.

Compound Addition is a Rule by which ſeveral numbers of different Denominations are collected together into one Sum.

RULE.

PLACE the numbers ſo that thoſe of the ſame Denomination may ſtand directly under each other, add the firſt row or loweſt Denomination together as in ſimple Addition and divide the Sum by as many of the ſame Denomination as make one of the next greater: ſet down the Remainder and carry the Quotient to the next ſuperior Denomination. Proceed thus through all the Denominations to the higheſt, which add as in ſingle Addition.

NOTE

Note. Addition of Money may be performed by the help of the Shillings and Pence Table.

Examples.

1 *L.*	*S.*	*D.*	2 *L.*	*S.*	*D.*
174	11	4¼	147	14	9¾
89	18	10½	77	10	4¾
714	14	7¼	10	10	10¼
64	19	11¼	7	7	7
108	14	9	19	4	11¼
74	14	7¾	19	3	10¼
64	13	10	14	10	9
174	19	4	74	13	8¾
67	12	5	104	14	9¾
149	15	9¾	74	13	10¼
74	9	7	36	18	5¾
£			£		

3. A is indebted to B 27l. 4s. 10d. to C 108l. 11s. 7¼d. to D 157l. 0s. 6d. to E 957l. 11s. 10d. to F 149l. 11s. 10d. to G 194l. 10s. 6d. and to H 900l. 5s. 4d. What is A's whole Debt?

4. A Cornfactor has paid for Wheat 49l. 11s. 10d. for Rye 47l. 13s. 10d. for Oats 104l 19s. 10d. for Barley 77l. 11s. 3d. for Peas 88l. 11s. 9d. for Carriage and other incidental charges 5l. 11s. 1½d. for an Inſurance 12 Guineas; his Commiſſion on the whole amounts to 10 Guineas; for what Sum muſt he draw upon his Employer to clear the Account?

5. R of Rotterdam is Debtor to H of Hull for 50 Firkins of Butter, 75 Guineas; for 15 Pieces of Yorkſhire Cloth 215l. 11s. 10d. for 24 Fother of Derbyſhire Lead 557l. 11s. 9d. for Cheeſe 65l. 11s. 4d. for Bar Iron 100l. 19s. 7d. for his Acceptance of a Bill drawn for 571l. 11s. 9d. H has alſo paid Convoys, Inſurances, port-charges &c. 27l. 11s. for Warehouſe Room, Cartage, &c. 7l. 7s. the Factorage of the whole amounts to 100 Guineas. For what Sterling Money muſt H draw upon R to clear this account?

6. A Gentleman bought of a Silver Smith Diſhes to the Weight of 16lb. 10 oz. 14dwts. Plates 42lb. 9 oz. 9dwt. Spoons 14lb. Salts 12lb. 9 oz. Waiters 9lb. 5 oz. 8dwt. Tankards 8lb. 9 oz. and a Silver Tea-board and other Articles to the Weight of 14lb. 7 oz. 8dwt What Weight of Plate did he buy in all?

7. A Merchant in London bought of a Farmer in Kent eight Bags of Hops. No. 1. weighed 3 cwt. 2qrs. 4lb. No. 2. 2 cwt. 3qrs. 6lb. No. 3. 4cwt. 2qrs. 27lb. No. 4. 2cwt. 3qrs. No. 5. 4cwt. 2qrs. 23½lb. No. 6. 6cwt. 2qrs. 24lb. No. 7. 7cwt. 2qrs. 25¼lb. and No. 8. 5cwt. 3qrs. 12lb. the Merchant by Agreement was to pay the Carriage to Town, how many cwt. had he to pay for?

8. I bought 6 Parcels of Cloth, the firſt contained 37yards. 2qrs. the ſecond 54yds. 3qrs. 2n. the third, 33yds. 3qrs. 2n. the fourth

fourth 72 yds. 2qrs. 3n. the fiſth 25½yds. and the ſixth 49¼yds. how many yards did I buy in all?

9. A Chemiſt mixed up eight different Medicines, weighing, as follows 749 ʒ. 2 ℈. 19gr. 607 ʒ. 1 ℈. 18gr. 734 ʒ. 2 ℈. 17gr. 400 ʒ. 74 ʒ. 1 ℈. 13gr. 725 ʒ. 2 ℈. 14gr. 64 ʒ. 2 ℈. 18gr. and 174 ʒ. 2 ℈. 19gr. what was the Weight of the Whole?

10. Collect into one Sum the Weight of the following Drugs, viz. Rhubarb 84lb. 10 ℥. 7 ʒ. Senna 74lb. 10 ℥. 6 ʒ. Salts 37lb. 5 ℥. Antimony 19lb. 4 ℥. 3 ʒ. Magneſia Alba 74lb. 1 ℥. 2 ʒ. Peruvian Bark 74lb. 2 ℥. 6 ʒ. Borax 19lb. 2 ℥. 4 ʒ. Caſtor 74lb. 9 ℥. 5 ʒ.

11. Bought Groceries weighing as follows, 37lb. 5 oz. 5drs. 27lb. 14 oz. 9drs. 6lb. 3 oz. 11drs. 74lb. 14 oz. 14dr. 70lb. 64lb. 8 oz. 9drs. and 74lb. 14 oz. 10drs. what is the whole Weight?

12. Bought the following Parcels of Cloth; viz. 77E. E. 4qrs. 2n. 24E. E. 3qrs. 2n. 74E. E. 2qrs. 2n. 49E. E. 3qrs. 2n. 74E. E. 2qrs. 1n. 74E. E. 2qrs. 2n. 44E. E. 3qrs. 2n. and 74E. E. 2qrs. 3n. what did I buy in all?

13. Sold eight Pieces of Holland meaſuring 724E. F. 2qrs. 3n. 635E. F. 3qrs. 2n. 734E. F. 2qrs. 3n. 724E. F. 2qrs. 2n. 349E. F. 1qr. 2n. 738E. F. 2qrs. 3n. 439E. F. 2qrs. 3n. 700E. F. 2qrs. 2n. how much was ſold in all?

14. Add into one Sum 37Lea. 2m. 7f. 34Lea. 1m. 6f. 74Lea. 2m. 7f. 69Lea. 1m. 4f. 74Lea. 2m. 69Lea. 2m. 5f. 74Lea. 2m. 2f. and 94Lea. 3f.

15. Collect into one Sum 249f. 39p. 5¼yds. 624f. 37p. 4¾yds. 734f. 29p. 3½yds. 674f. 17p. 2¼yds. 759f. 27p. 2¾yds. 597f. 29p. 2½yds. 754f. 34p. 3¼yds. 704f. 35p. 3¾yds.

16. Add together 574f. 9in. 2b. c. 49f. 8in 1b. c. 74f. 5in. 2b. c. 64f. 9in. 1b. c. 74f. 10in. 2b. c. 65f. 5in. 2b. c. 74f. 9in. 65f. 9in. 1b. c.

17. Bought eight Parcels of Land, viz. 77A. 3R. 39P. 64A. 2R. 37P. 74A. 3R. 25P. 65A. 2R. 29P. 76A. 1R. 28P. 63A. 2R. 17P. 25A. 2R. 3P. 75A. 3R. 11P. how many Acres did I buy?

18. A Vinter bought eight Lots of Wine, viz. 733Tuns 3Hhd. 62Gal. 626T. 2H. 61G. 473T. 3H. 39G. 365T. 2H. 38G. 269T. 3H. 59G. 285T. 1H. 35G. 385T. 2H. 59G. 856T. 2H. 61G. how much has he to pay for?

19. A Wine Merchant ſold eight Lots of Brandy and Wine, viz. 66Tierces 41Gal. 3Qt. 65T. 40G. 2Q. 88T. 29G. 2Q. 68T. 19G. 2Q. 95T. 37G. 3Q. 69T. 29G. 3Q. 50T. 39G. 2Q. 28T. 41G. 3Q. how many Tierces did he ſell?

20. A Brewer ſold 74B. B. 3fir. 8Gal. 14B. 2F. 8G. 33B. 1F. 3G. 50B. 2F 3G 29B 2F 2G 39B 1F 8G 63B 2F 6G 36B 3F 5G how much did he ſell?

21. Bought of a Brewer 835Hhd 38G 3qt 639H 30G 2Q 394H 53G 2Q 656H 40G 3Q 599H 32G 2Q 366H 33G 2Q 300H 32G 3Q 99H 33G 2Q how many Hogſheads did I buy?

22. A Cornfactor bought eight Parcels of Corn, viz. 53ch 26b 3p 80c 28b 1p 65c 30b 3p 59c 18b 2p 66c 29b 3p 69c 30b 1p 63c 25b 3p 95c 30b 3p how many Chaldrons did he buy?

23. Bought Wheat as follows, viz. 149qr. 7b. 3p. 715qr. 3b. 2p. 649qr. 1b. 3p. 479qr. 2b. 1p. 675qr. 1b. 3p. 149qr. 2b. 1p. 375qr. 5b. 2p. 649qr. 7b. 3p. how many Quarters did I buy?

24. Add together 737yrs. 8m. 3w. 347y. 11m. 2w. 618y. 10m. 1w. 374y. 9m. 2w. 175y. 3m. 1w. 714y. 5m. 3w. 615y. 10m. 1w. and 714y. 3m. 1w.

25. Collect into one Sum 714days 23hrs. 56min. 74d. 14h. 54m. 64d. 21h 55m. 74d. 13h. 53m. 69d 12h. 14m. 74d. 12h. 19m. 37d. 11h. 17m. 16d. 12h. 19m.

COMPOUND SUBTRACTION.

COMPOUND Subtraction teaches us to find the Difference of any two Numbers of different Denominations.

EXAMPLES.

1 A Horſe in his Furniture is worth 52l. 10s. out of it 24l. 10s. 6d. how much does the Price of the Furniture exceed that of the Horſe?

2 What Sum added to 11l. 14s. 9¼d. will make 133l. 11s. 9½d?

3 A Tradeſman failing was indebted to A 105l. 19s. 11d. to B 150 Guineas; to C 34l 18s. 10d. to D 500l. 19s; to E 700l. 14s. 9d. when this happened he had Caſh by him to the amount of 50l. Goods to the amount of 350l. 14s. 9d. his Houſehold Furniture was worth 24l. 11s. his Book Debts amounted to 94l. 14s. 8d. if theſe things were faithfully delivered up to his Creditors, what did they loſe by him?

4 The great Bell at Oxford, the heavieſt in England, weighs 7ton 11cwt. 3qr. 14lb. St. Paul's Bell at London weighs 5t. 2cwt. 1qr. 22lb. and Tom of Lincoln weighs 4t. 16 cwt. 3qr. 18lb. how much are theſe Bells together inferior in Weight to the great Bell at Moſcow, the largeſt in the World, which weighs 198t. 2cwt. 1qr?

5 An Apprentice, who is 14 years 11 Months 3 Weeks 4 Days 15 Hours 38 Minutes old is to ſerve his Maſter till he is 21years of Age; how long has he to ſerve ?

6 What is the Difference of Latitude and Longitude between Calcutta in the Eaſt Indies Lat.22°. 34' N. Long. 88°. 34' E. and Lima in South America Lat.12°. 1' S. Long.76°. 44' W ?

7 Out of a Stock of 60Tons 1p. 50Gal. I have ſold 15t. 1p 1h 41gal what have I left?

8 Suppoſe I have to travel 133Miles 6Fur 30P 2Yds how far have I to go after travelling 100M 3F 10P $4\frac{1}{2}$Yds ?

COMPOUND MULTIPLICATION

Compound Multiplication is a Rule by which we find the Amount of any given Number, of different Denominations, by repeating it any propoſed Number of Times

RULE.

MULTIPLY the loweſt Denomination by the Multiplier, divide the Product by the Number making one of the next higher Denomination, ſet down the Remainder and carry the Quotient to the Product of the next higher Denomination; proceed thus till all the Denominations are multiplied

But if the Multiplier has Parts annexed; for $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{6}$ &c. divide the top line by
2 3 4 5 6 &c.

EXAMPLES.

1 What coſt 6 yards of Cloth at 6s 9d?
2 7 Ells at 5s 11½d
3 8 Ounce at 7s 10d
4 9lb at 7s 5¼d
5 10 Gallons at 16s 4½d
6 11Cwt at 1l 9s 10½d
7 12 Sheep at 1l 17s 9d
8 In 9 Pieces of Kerſey, each 14yds 3qrs 2n how many yards?
9 What is the Weight of 12 Tankards each weighing 11 oz 10dwt 19gr?
10 16 Hogſheads at 3l 14s 5d
11 24 Yards at 1s 5½d
12 35 Cwt at 1l 14s 8½d
13 36 Tons at 5l 15s 11¼d.
14 84 Chaldrons at 1l 16s 9¾d
15 108 Buſhels at 7s 9¼d
16 132 Ells at 18s 9¼d
17 144 Butts at 5l 13s 9¾
18 In 32 Wedges of Gold, each 2lb 7 oz 14gr how many Pounds?
19 In 21 Fields, each 3 Acres 2r 19p how many Acres?
20 31 Yards at 12s 7¼d
21 39 Dozen at 6s 7¾d

22 139 Pair at 4s 9¾d
23 86lb of Silk at 19s 4d
24 111 Sacks of Flour at 1l 4s 9d
25 156 Cwt at 4l 9s 6d
26 In 57 Years each 13m 2d 6h how many Months ?
27 What is the Weight of 29 Hogſheads of Sugar each 7cwt 2qr 8lb ?
28 In 67 Parcels of Tea each 25lb 7 oz 3drs how many cwts, &c?
29 9¼ yards at 4s 6d
30 24¾ Ells at 7s 6d¼
31 34¼ cwt at 2l 6s 9¾
32 17¼qr at 5s 6½
33 357 Oxen at 7l 19s 5d
34 298lb of Indigo at 6s 3¼d
35 378 Ells at 5s 9¼d

COMPOUND DIVISION.

Compound Diviſion teaches to find how often one given Number is contained in another of different Denominations ; or to divide a given Compound Number into any propoſed Number of equal Parts.

RULE.

PLACE the Diviſor to the left Hand of the Dividend; Divide the higheſt Denomination of the Dividend by the Diviſor, and bring the Remainder, if any, into the next in-

inferior Denomination, adding thereto the Parts of that name in the Dividend; divide this Number by the Diviſor, and ſo on till the whole is finiſhed

EXAMPLES.

1 A Gentleman's Income is 1260l 5s 5d a Year, what is that per Day ?
2 Divide 47l 19s 4d by 3
3 Divide 37l 14s 10d by 24
4 Divide 49l 19s 10¼d by 66
5 Divide 34 14s 9¼d by 149
6 Divide 477l 19s 10¾d by 7¼
7 Divide 149l 10s 3¼d by 3⅝
8 Divide 1774l 19s 10¾d by 179
9 Divide 47 Yards 3qr 2n by 5
10 Divide 375A 3R 14P by 9
11 Divide 734lb 10 oz 12gr by 89
12 Divide 374 cwt 3qr 10lb by 48
13 Divide 47 oz 10dwt 12gr by 34⅞
14 If 112lb of Cheeſe coſt 2l 18s 8d what is that per lb ?
15 If 17cwt of Lead coſt 15l 5s 7¼d what coſts 1cwt ?
16 If 528lb of Tobacco coſt 23l 13s what coſts 1lb ?
17 A Prize of 3000 Guineas is to be divided among 350 Sailors, what is each Man's ſhare after deducting ⅛ Part for the Officers ?
18 Bought 6¼ Pieces of Tapeſtry, containing 337 Ells F 2qr 2n what is the Length of one Piece ?

REDUCTION

Reduction is the Method of reducing Numbers from one Name or Denomination, to another of the ſame Value

RULE

ALL great Names are brought into ſmall by multiplying with as many of the next leſs as make one of the greater adding to the Product the Parts of the leſs Name, if the Number to be reduced be a compound one: and all ſmall Names are brought into great by dividing with as many of the leſs, as make one of the next greater

EXAMPLES.

1 In 9 Pounds, how many Shillings, Pence and Farthings ?
2 In 55 Guineas, how many Shillings, Pence and Farthings ?
3 Reduce 54l 8s 9¼ into Farthings
4 Reduce 77l 5s 9d into Halfpence
5 Reduce 47l 4s 4d into Twopences
6 In 47l 9s 8d how many Groats, Pence and Farthings ?
7 How many Crowns, Half-Crowns, Shillings, Six-Pences and Pence are in 54l ?
8 In 33530 Farthings how many Pence, Shillings and Pounds ?
9 Reduce 300800 Farthings into Guineas

10 In 34050 Shillings how many Crowns and Pounds

11 In 303l 6s 3d how many Pieces of Coin each 7s 3d in Value ?

In 7494 Dollars at 4s 6d each, how many Groats, Shillings, Half-crowns, Crowns and Pounds ?

13 In 7lb 5 oz how many Grains ?

14 In 6720 Grains how many Ounces ?

15 In 4 Ingots of Silver each 27 oz 9dwt how many Grains ?

16 In 474 Spoons, each weighing 3 oz 9dwt how many Pounds of Silver ?

17 How many Pints each 9 oz may be made out of 7lb 6 oz 4dwt of Silver ?

18 In 35lb how many Scruples and Grains?

19 In 97930 Grains how many oz and lbs?

20 In 35℔ 1℥ 1ʒ 1℈ how many Grains?

21 In 374947 Grains how many Pounds ?

22 In 34 Tons of Iron how many lb ?

23 In 303600lb of Iron how many Tons ?

24 In 375 Cwt 3qr 5lb of Copper how many lb ?

25 Reduce 740900 oz into Cwts and Tons

26 In 39 Bags of Hops each 3cwt 3qr 4lb how many Cwts ?

27 In 135 Cwt of Raiſins how many Parcels each 90lb ?

28 In 570 great Pounds of Silk how many Common ?

29 In 750 Fother of Lead each 19½ Cwt how many Cwt ?

30 In 304 Yards of Cloth how many Nails?

31 In 576 French Ells how many Yards?

32 Reduce 97 Yards 3qrs. into Engliſh Ells.

33 In 57 Pieces of Holland, each 35 Ells Flem. how many Nails?

34 In 14 Bales of Cloth, each 17 Pieces, each Piece 56 Ells Flem. how many Yards?

35 In 471 Miles how many Furlongs and Poles?

36 In 123200 Yards how many Miles?

37 In 50 Miles how many Yards, Feet, Inches, and Barley-corns?

38 Reduce 37m. 2fur. 37p. 5f. 6in. into Feet.

39 Reduce 17400 Chains into Furlongs.

40 In 77A. 1R. 14P. how many Perches?

41 In 17280 Perches how many Acres?

42 If a Piece of Ground, containing 14A. 34P. be taken from a Field of 50 Acres, how many Perches will the Remainder contain?

43 Reduce 32 Hogſheads into Quarts.

44 In 3276 Gallons how many Tons?

45 How many Gallons and Pints are in 75 Hogſheads?

46 In 77 Hogſheads of Brandy how many ½ Ankers?

47 In 38 Hogſheads of Ale in London how many Pints?

48 In 38 Hogſheads of Ale, in the Country how many Pints?

49 Reduce 516 Barrels of Beer, London Meaſure, into Half Pints.

50 In 44 Quarters of Corn how many Pecks?

51 In 30720 Quarts how many Laſts?

52 In 50 Chaldrons of Coals how many Pecks?

53 In 365d. 5h. 48m. 55ſec. being a Solar Year, how many Seconds?

54 In 354d. 8h. 48m. 36½ſec. being a lunar Year, or 12 lunar Months, how many Seconds?

55 How many Days, Hours, Minutes, and Seconds have elapſed from the Creation of the World, to Chriſtmas 1792, ſuppoſing the Creation to have been 4004 Years befor the Incarnation of Chriſt?

56 From May 18th. 1788, to February 18th 1815, how many Days?

DIRECT PROPORTION OR THE RULE OF THREE.

Direct Proportion teaches by three given Numbers, to find a fourth in ſuch Proportion to the third as the ſecond is to the firſt.

RULE.

STATE the Queſtion by placing the Numbers in ſuch Order that the firſt and third may be of one kind, and the ſecond the ſame as the Number required : then bring the firſt and third Numbers into one Name, and the ſecond into the loweſt Denomination mentioned. Multiply the ſecond and third Terms together, divide the Product by the firſt, and the Quotient will be the Anſwer in the ſame Denomination as the ſecond Number.

EXAMPLES.

1 If 2 Cwt. 3qr. 14lb. of Sugar coſt 6l. 14s. 2d. what will 12 Cwt. 3qrs. coſt?

2 If 12 Cwt. 3qrs. of Sugar be bought for 29l. 15s. what will 2 Cwt. 3qrs. 14lb. coſt?

3 If 6l. 14s. 2d. be paid for 2 Cwt. 3qrs. 14lb. of Sugar, what Quantity may be bought for 29l. 15s.

4 If 29l. 15s. will buy 12 Cwt. 3qrs. of Sugar what Quantity will 6l. 14s. 2d. buy?

5 If a Cwt. of Tobacco be worth 9l. 16s. what is the worth of 1lb?

6 If 1lb. of Butter coſt 5¼d. what will a Firkin or 56lb. coſt?

7 Bought 3½ Yards of Cloth for 2l. 16s. 3d. what muſt I give for 28¼ Yards at the ſame Rate?

8 If I buy 56 Yards of Cloth for 40 Guineas, how many Ells Flemiſh can I buy for 1135l. 10s ?

9 A Sailor entered on board a Man of War the 14th. of May 1780, and was diſcharged the 11th of December 1783, what came his Wages to at 1l. 5s. per Month ?

10 How long will a Perſon be in ſaving 100l if he lay by 1s. 6d. per Week.

11 Bought 55 Yards of Holland for 11l. 5s. how many Ells Engliſh can I buy for 100 Guineas at the ſame Rate ?

12 A Factor bought 30 Quarters of Corn for 76l. 17s. 6d. and 150 Quarters of an inferior kind for 361l. 11s. 8d. to mix with it; how muſt he ſell the Mixture per Buſhel to gain 20l. by the Bargain ?

13 Bought 27 Pieces of Cloth, each 34 Ells at 7s. 6d. per Ell. what is the Value of the whole ?

14 A Creditor agrees to receive of his inſolvent Debtor after the Rate of 10s. 6d in a Pound, for a Debt of 475l. 10s. how much will he receive in the whole ?

15 If 18l. 14s. 9¼d. were paid for the Carriage of 53 Cwt. 2qrs. 5lb. what was paid for the Carriage of 1lb ?

16 A Bankrupt's Effects amount to 1000½ Guineas. His Debts amount to 2547l. 14s. 9d. what will his Creditors receive in the Pound ?

17 The Rental of a Village is 4714l. 11s 10d a Tax of 117l. 17s. 3½d. is to be made for the Support of the Poor; at what Rate per Pound muſt the Aſſeſſment be made?

18 A Gentleman pays Taxes for 350l: 14s. the Rental of the whole Village is 4714l 11s. 10d. upon which a Tax is impoſed amounting to 235l. 14s. 7d. What Sum muſt this Gentleman pay towards this Tax?

19 If a Tax of 9d. in the Pound be impoſed upon a Village for the Support of the Poor, what Sum muſt a Gentleman pay towards it, who pays Taxes for 350l 14s?

20 Bought 14 Hogſheads of Sugar, each weighing 7 Cwt. 1qr. 14lb. at 2l. 14s 9d per Cwt. what do they come to?

21 If a Pack of Wool weigh 2 Cwt. 2qrs. 14lb. what is it worth at 17s. 6d. per Todd?

22 Bought 157 Fother of Lead at 5l. 5s. per Cwt. paid Carriage, &c. 5 Guineas; what does the Lead ſtand me in per lb.

23 If an Ounce of Gold be worth 3l. what is the worth of 14 Ingots each 3lb. 11oz. 15dwt. 13gr?

INVERSE PROPORTION.

Inverſe or reciprocal Proportion teaches by three given Numbers to find a fourth, in ſuch Proportion to the ſecond as the firſt is to the third.

RULE.

STATE the Queſtion as in direct Proportion. Multiply the firſt and ſecond Terms together, and divide the Product by the third, the Quotient will be the Anſwer, and of the ſame Denomination as you left the ſecond Number.

EXAMPLES.

1 If a Field of Graſs be mowed by 10 Men in 12 Days, in how many Days wonld it be mowed by 20 Men?

2 A certain Piece of Graſs was to have been mowed by 20 Men in 6 Days; an extraordinary Occaſion calls off Half of the Workmen.—It is required in what Time the Reſt will finiſh it?

3 If the Penny loaf weigh 8 oz. when Flour is at 2s: a Peck, what ſhould it weigh when Flour is ſold for 2s. 6d. the Peck?

4 If 3yds. 2qrs. of Cloth of 1yd. 3qrs. wide will make a Suit of Cloths, how many Yards of Stuff of ¼yard wide will make a Suit for the ſame Perſon?

5 If I lend my Friend 200l. for 12 Months, on Condition of his returning the Favor, how long ought he to lend me 150l. to requite my Kindneſs?

The UNIVERSAL RULE of PROPORTION.

1 SET down the Terms expreſſing the Conditions of the Queſtion in one Line, taking Care to ſeperate the *Cauſe* from the *Effect*.
2 Under each conditional Term ſet its correſponding one in another Line, marking the Term ſought or wanting with an Aſteriſm.
3 Draw Croſs lines from the *Cauſe* Term or Terms, in the firſt part of the firſt Line, to the *Effect* Term or Terms, in the ſecond part of the ſecond Line; and from the *Effect* Term or Terms, in the ſecond part of the firſt Line, to the *Cauſe* Term or Terms in the firſt part of the ſecond Line.
4 Multiply the Term or Terms, at that end of the Croſs line, where the Star Term is found, into the Term or Terms, at the other end of that Line for a Diviſor; then multiply all the Terms together, ſtanding at contrary ends of the other Croſs Line, for a Dividend. The Quotient will be the Anſwer.

EXAMPLES.

1 If 7 Men in 12 Days can reap 126 Acres, in how many Days will 16 Men reap 72 Acres?
2 A Carrier receives 15l. 12s. for the Carriage of 4½ Tons 18 Miles, how much will he carry 72 Miles for 20 Guineas?

3 An ordinary of 100 men drank 20ls. worth of Wine at 2s. 6d. per Bottle; how many Men at the ſame Rate of Drinking will 7ls. worth ſuffice when Wine is rated at 1s. 9d per Bottle ?

4 If the Carriage of 126lb. for 100 Miles coſts 6s. how many Pounds may I have carried 750 Miles for a Guinea ?

5 If 24 Meaſures of Wine, at 3s. 4d. each, ſerve 16 Men for 6 Days, how many Meaſures at 2s. 8d. each, will ſerve 48 Men for 4 Days ?

PRACTICE.

PRACTICE has its Name from its daily uſe amongſt Merchants and Tradeſmen, being an eaſy and conciſe Method of working moſt Queſtions that occur in Trade and Buſineſs, and is only a Contraction of the Rule of Three when the firſt Term is an Unit.

A TABLE of the Aliquot parts of MONEY.

Of a Pound.

s.	d.		l.	s.	d.		l.
10	0	-	$\frac{1}{2}$	3	4	-	$\frac{1}{6}$
6	8	-	$\frac{1}{3}$	2	6	-	$\frac{1}{8}$
5	0	-	$\frac{1}{4}$	2	0	-	$\frac{1}{10}$
4	0	-	$\frac{1}{5}$	1	8	-	$\frac{1}{12}$

Of a Pound.

s.	d.	l.	s.	d.	l.
1	4	$\frac{1}{15}$ – $\frac{1}{5}$ of $\frac{1}{3}$		$7\frac{1}{2}$	$\frac{1}{32}$ – $\frac{1}{4}$ of $\frac{1}{8}$
1	3	$\frac{1}{16}$ – $\frac{1}{4}$ of $\frac{1}{4}$		6	$\frac{1}{40}$ – $\frac{1}{4}$ of $\frac{1}{10}$
1	0	$\frac{1}{20}$		5	$\frac{1}{48}$ – $\frac{1}{4}$ of $\frac{1}{12}$
	10	$\frac{1}{24}$ – $\frac{1}{4}$ of $\frac{1}{6}$		4	$\frac{1}{60}$ – $\frac{1}{6}$ of $\frac{1}{10}$
	8	$\frac{1}{30}$		$3\frac{3}{4}$	$\frac{1}{64}$

Of a Shilling.

d.	s.	d.	s.
6	$\frac{1}{2}$	1	$\frac{1}{12}$
4	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$ of $\frac{1}{8}$ – $\frac{1}{16}$
3	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$ of $\frac{1}{12}$ – $\frac{1}{24}$
2	$\frac{1}{6}$	$\frac{1}{4}$	$\frac{1}{4}$ of $\frac{1}{12}$ – $\frac{1}{48}$
$1\frac{1}{2}$	$\frac{1}{8}$		

A Table of the Aliquot parts of Weights and Meaſures.

AVOIRDUPOIS WEIGHT.

Of a Ton.

cwt.	ton.	cwt.	ton.
10	$\frac{1}{2}$	$2\frac{1}{2}$	$\frac{1}{8}$
5	$\frac{1}{4}$	2	$\frac{1}{10}$
4	$\frac{1}{5}$	[illegible]	[illegible]

Of a Cwt.

qr.	lb.		lb.
2 or	56	-	$\frac{1}{2}$
1 or	28	-	$\frac{1}{4}$
	16	-	$\frac{1}{7}$
	14	-	$\frac{1}{8}$

Of quarter Cwt. or 28lb

lb.		
14	-	$\frac{1}{2}$
7	-	$\frac{1}{4}$
4	-	$\frac{1}{7}$
3½	-	$\frac{1}{8}$

Of half a Cwt. or 56lb.

lb.		
28	-	$\frac{1}{2}$
14	-	$\frac{1}{4}$
8	-	$\frac{1}{7}$
7	-	$\frac{1}{8}$

Of a Pound.

oz.		lb.
8	-	$\frac{1}{2}$
4	-	$\frac{1}{4}$
2	-	$\frac{1}{8}$

TROY WEIGHT.

Of an Ounce.

dwt.	gr.		oz.
10	0	-	$\frac{1}{2}$
6	16	-	$\frac{1}{3}$
5	0	-	$\frac{1}{4}$
4	0	-	$\frac{1}{5}$
3	8	-	$\frac{1}{6}$
2	12	-	$\frac{1}{8}$
2	0	-	$\frac{1}{10}$
1	16	-	$\frac{1}{12}$

Of a Dwt.

gr.		dwt.
12	-	$\frac{1}{2}$
8	-	$\frac{1}{3}$
6	-	$\frac{1}{4}$
4	-	$\frac{1}{6}$
3	-	$\frac{1}{8}$
2	-	$\frac{1}{12}$

LAND MEASURE.

Of an Acre.

R.	P.		A.
2	0	-	$\frac{1}{2}$
1	0	-	$\frac{1}{4}$
	32	-	$\frac{1}{5}$

P.		A.
20	-	$\frac{1}{8}$
16	-	$\frac{1}{10}$
8	-	$\frac{1}{20}$

CLOTH MEASURE.

Of a Yard.

Q.	N.		Y.
2	0	-	$\frac{1}{2}$
1	0	-	$\frac{1}{4}$
	2	-	$\frac{1}{8}$
	1	-	$\frac{1}{16}$ - $\frac{1}{4}$ of $\frac{1}{4}$

Of an Engliſh Ell.

Q.	N.		E. E.
2	2	-	$\frac{1}{2}$
1	1	-	$\frac{1}{4}$
1	0	-	$\frac{1}{5}$
	2	-	$\frac{1}{10}$
	1	-	$\frac{1}{20}$

Of a Flemiſh Ell.

Q.	N.		F. E.
1	2	-	$\frac{1}{2}$
1	0	-	$\frac{1}{3}$
	3	-	$\frac{1}{4}$
	2	-	$\frac{1}{6}$
	1	-	$\frac{1}{12}$

Of a French Ell.

Q.	N.		Fr. E.
3	0	-	$\frac{1}{2}$
2	0	-	$\frac{1}{3}$
1	2	-	$\frac{1}{4}$
1	0	-	$\frac{1}{6}$
	3	-	$\frac{1}{8}$
	2	-	$\frac{1}{12}$
	1	-	$\frac{1}{24}$ - $\frac{1}{6}$ of $\frac{1}{4}$

RULE.

WHEN the Price is leſs than two Shillings, Divide the Quantity by the aliquot Parts of the Price. When the Price is two Shillings or more, but leſs than 20s. multiply the Quantity by half the even Number of Shillings, double the firſt Figure for Shillings, and aliquot Parts; for the remaining Part of the Price (if any). When the Price is Pounds, &c. multiply the Quantity by the Pounds, and take Parts for the Reſt, &c.

EXAMPLES.

1 What coſt 371 Yards of Tape at ¼d per Yard?
2 5714 at ¾d.
3 3749 at 1d.
4 3741 at 2d.
5 1749 at 4d.
6 6714 at 1¼d.
7 1749 at 2¼d.
8 5794 at 2¾d.
9 574 at 3½d.
10 749 at 4¼d.
11 3749 at 4¾d.
12 146 at 5¼d.
13 1493 at 5¾d.
14 1741 at 6½d.
15 547 at 7d.
16 5491 at 7½d.
17 1498 at 8d.
18 749 at 8¼d.
19 1747 at 8¾d.
20 7143 at 9¼d.
21 374 at 9¾d.
22 3751 at 10¼d.
23 4971 at 11d.
24 321 at 12½d.
25 574 at 13d.
26 4949 at 13½d.
27 495 at 14d.
28 371 at 14½d.
29 3719 at 15d.
30 4749 at 15½d.
31 498 at 16d.
32 5714 at 16½d.
33 3751 at 17d.
34 375 at 17½d.

35 5794 at 17¼d.
36 371 at 18¼d.
37 3751 at 18¾d.
38 371 at 19¼d.
39 579 at 19¾d.
40 3741 at 20¼d.
41 379 at 20¾d.
42 375 at 21¼d.
43 495 at 21¾d.
44 5931 at 22¼d.
45 541 at 22¾d.
46 5497 at 23¼d.
47 4984 at 23¾d.
48 3714 at 23¾d.
49 475 at 2s.
50 1754 at 4s.
51 1789 at 6s.
52 5413 at 8s.
53 344 at 10s.
54 794 at 11s.
55 149 at 13s.
56 495 at 15s.
57 794 at 17s.
58 371 at 19s.
59 371 at 2s. 6d.
60 574 at 5s. 7d.
61 512 at 7s. 6d.
62 1749 at 5s. 8d.
63 493 at 3s. 2d.
64 754 at 4l. 2s.
65 149 at 9l. 4s.
66 191 at 12l. 6s.
67 512 at 5l. 8s.
68 360 at 2l. 10s.
69 344 at 2l. 11s.
70 351 at 4l. 13s.
71 372 at 2l. 15s.
72 314 at 1l. 17s.
73 374 at 19l. 19s.
74 471 at 5l. 14s 9¼d
75 415 at 4l 11s 10½d
76 7494 at 10l 17 10½
77 7251 at 14l 11s 5¼
78 371⅜ at 3l 17s 7¾d
79 4917⅛ at 4l 18 10¼
80 1375⅝ at 2l 19 11¾
81 4759⅞ at 4l 15 9¾
8[illegible] 574⅜ at 19l 13s 6d
83 3749⅛ at 4l 19 10¼

84 19 Cwt. 3qrs. 11lb. of Hops at 4l. 11s. 9d. per Cwt.

85 11 Cwt. 1qr. 16lb. of Soap at 3l. 7s. per Cwt.

86 9 Tons 13 cwt. 3qrs. 19lb. at 14l. 15s. 9d. per Ton.

87 74 oz. 2dwt. 12grs. of Silver at 4s. 11¼d. per oz.

88 571 oz. 14dwt. 16¼grs at 3l. 11s. 9¾d. per oz.

89 51A. 3R. 15P. at 4l. 10s. per Acre.

90 514 Yards 3qrs. 2n. at 17s. 9¾d. per yd.

91 What coſt 17 French Ells 1qr. 3n. of Bruſſels Lace at 3l. 19s. 11¼d. per Ell.

92 475 Yards 3qrs. 2n. at 1l. 14s. 9¾d. per Ell Engliſh.

TARE and TRETT.

1 Tare and Trett are practical Rules for deducting certain Allowances made by Merchants and Tradeſmen in ſelling their Goods by Weight.

2 TARE is an Allowance made to the Buyer, for the Weight of the Box, Barrel, Bag, Cheſt, Wrappers, &c.

3 TRETT is an Allowance of 4lb. in 104 for Waſte, Duſt, &c.

4 *Cloff* or *Draught* is an Allowance of 2lb. for every 3 Cwt. made by the Seller to the Buyer, that the Weight may hold good when ſold by Retail.

5 *Groſs Weight* is the whole Weight of any ſort of Goods together with the Box, Barrel, Bag, &c. that contains it.

6 *Suttle* is when Part of the Allowance is deducted from the Groſs.

7 *Neat Weight* is what remains after all Allowances are deducted.

PROP. 1

When the Tare is at ſo much in the whole Weight, to find the neat Weight.

RULE.

Subtract the Tare from the Groſs and the Remainder will be the neat Weight.

PROP. 2

When the Tare is at ſo much per Box, Bag, Barrel, &c.

RULE.

Multiply the Number of Boxes, Barrels, &c. by the Tare and ſubtract the Product from the Groſs.

PROP. 3

When the Tare is at ſo much per Cwt.

RULE.

If the Tare be an aliquot Part of a Cwt. divide the Groſs Weight by the aliquot Part, and the Quotient will be the Tare to be deducted from the Groſs. If the Tare be not an aliquot Part of a Cwt. firſt take ſome aliquot Part of a Cwt. and then Part of *that* Part, &c. according to the nature of the Queſtion, the Sum of the Quotients belonging to theſe Parts will be the whole Tare, which deduct from the Groſs.

PROP.

PROP. 4

The Groſs Weight of any ſort of Merchandiſe given to find the neat Weight, when Trett is allowed with Tare.

RULE.

Find the Tare as before, and ſubtract it from the Groſs, the Remainder will be the Suttle. Then divide the Suttle by 26, and the Quotient will be the Trett, which deduct from the Suttle.

PROP. 5

The Groſs Weight of any ſort of Merchandiſe given to find the neat Weight, when Tare, Trett, and Cloff are allowed.

RULE.

Find the *neat* Weight by the laſt Rule, and call that the *ſecond* Suttle. Then divide the ſecond Suttle by 168 and the Quotient will be the Cloff, which take from the ſecond Suttle.

EXAMPLES.

1 Required the neat Weight of 27 Bales of Silk each Weighing 349¼lb. Groſs, Tare in the whole 3 Cwt. 1qr. 15lb.

2 Required the neat Weight of 19 Caſks of Indigo, each Weighing 4 Cwt. 1qr. 14lb. Groſs; Tare per Caſk 37lb?

3 Required the neat Weight of 47 Hogſheads of Tobacco, weighing 147 Cwt. 1qr. 11lb. groſs; Tare 75lb. per Hogſhead?

4 Required the neat Weight of 29 Barrels of Pot-aſh, each weighing 1 Cwt. 3qrs. 18lb. groſs; Tare 12lb. per Cwt.

5 Required the neat Weight of 15 Caſks of Argol, weighing groſs, 97 Cwt. 2grs. 15lb. Tare 15lb. per Cwt.

6 How much neat Weight is contained in 12 Cwt. 3qrs. 19lb. groſs, Tare in the whole 37lb. Trett 4lb. per 104?

7 In 7 Hogſheads of Tobacco, each 5 Cwt. 3qrs. 17lb. groſs, Tare 11lb. per Cwt. Trett 4lb. per 104 Cloff 2lb. for every 3 Cwt. how much neat Weight?

8 The neat Weight of 5 Caſks of Currants is required, each weighing 7 Cwt. 3qrs. 11lb groſs, Tare 2qrs. 11lb. per Caſk, Trett 4lb. per 104, and Cloff 2lb. for 336lb.

BILLS of PARCELS.

1 January, 1ſt. 1793.

Mr. Lamb,

Bought of John Gibſon

l. s. d.

7½ lb. of Green Tea at 10s. 4d. p. lb
14¼ --- of Fineſt Bloom at 14s. 8d—
10¾ --- of Fine Green at 11s. 5d.—
21 --- of Hyſon - at 10s. 10½d.—
19 --- of Good Hyſon at 13s. 9½d—
8¼ --- of Bohea - at 6s. 9d.—

£.

2 Barnardcaſtle, 1793.

Henry Maire, Eſq.

To John Watſon Dr.

l. s. d.

Jan. 11. For 37¼ Yards of Sheeting at 1s. 4½d per Yard
Feb. 3. For 48⅛ Yards of Lace at 4s. 0¾d.
16. For 75⅜ Ells of Iriſh at 2s 3d
May 12. For 209 do. of Dowlas at 9¼d
15. For 730 do. of Muſlin at 7s 0½

£.

3 Barnardcaſtle. Feb. 6th. 1793.

George Hobſon, Eſq.

Bought of John Lonſdale

	l.	*s.*	*d.*
A Loin of Lamb, Weight 7¼lb. at 10d per lb.			
A Fillet of Veal, Weight 16¾lb. at 6½d			
A Buttock of Beef, Weight 37¾lb. at 4¾d			
A Pig, Weight 12¾lb. at 7¾d.			
A Leg of Pork, Weight 16¾lb. at 5¾d			
A Leg of Mutton Weight 13¾lb. at 4¾d			
£.			

4 Barnardcaſtle, Feb. 26th. 1793.

Miſs Lodge,

Bought of J. Ewbank

	l.	*s.*	*d.*
19¾ Yards of Flanders Lace at 9s. 8d. per Ell.			
27⅝ Yds. of Dreſden Lace at 15s. 5¾d—			
113¾ Yds. of Gauze, at 2s. 2d.—			
215 Yds. of Muſlin, at 7s. 5d. per yd.			
25⅜ Dozen of Napkins, at 27s. 6d, per Dozen.			
118 Pair of Kid Gloves, at 1s. 8d. per pair.			
£.			

5 Lodge, Feb. 28th. 1793.

Mrs. Baſs,
Bought of W. Dobſon

l. s. d.

Tares, 104 Buſhels, at 2s. 7d. per Buſ.
Peas, 127 Bu. 3 Pecks, at 1s. 10½d—
Malt, 46¼ Quarters, at 1l 14s 4d p. Q.
Oats, 204⅝———— at 18s. 6d.—
Beans, 12⅞———— at 1l. 17s. 3d.—

£.

6 Barnardcaſtle, Feb. 7th. 1793.

Mr. Dowſon,
Bought of John Watſon

l. s. d.

[illegible] Pieces of Fuſtians, each 27 Yards at 1s. 4d. per Yard
5 Pieces of Iriſh, each 25Y. at 2s 4d—
7 Pieces of Check, each 31Yds. at 10d—
8 Pieces of Dowlas, each 29Yds. at 7¼d—
12 Pieces of Plaid, each 37Yds. at 1s 10d—
11 Pieces of Dimity, each 18Yds. at 2s. 1½d.

£.

7 B. caſtle, March 1. 1793. 6Parcels of Muſlin

Mr. Garth,

Bought of M. Watſon

l. s. d.

No. 1. 24Fl. E. 2qr. 1n. at 6s 9d p. y.
——2 27 1 3 at 7s 2d——
——3. 21 0 2 at 8s 4d—
——4. 34 1 1 at 5s 3d—
——5. 19 2 2 at 7s 9d—
——6. 27 1 3 at 7s 2½d—

£.

8 Barnardcaſtle, March 1ſt. 1793.

Mr. Hutchinſon,

Bought of T. Crampton

l. s. d.

14Cwt. 1qr. 19lb. of Tobacco, at 4l. 17s. 2d. per Cwt.
17Cwt. 2qr. 17lb. of Snuff, at 5l 19. 4—
18 3 16 of Tobacco, in Leaf at 3l. 10s. 6d.—
9Cwt. 0qr. 15lb. of Sugar at 2l 12. 6—
0 3 10 of Soap, at 2l 17. 4—
49 1 9 of Molaſſes, at 1l. 16s. 4d.—

£.

Received at the ſame time the Contents,

T. Crampton.

9 Barnardcaſtle, 1793.

Mr. Garth,

To Thomas Middleton, Dr.

l. s. d.

Jan. 2d. 4¾ Pieces of Muſlin, each
37¾ Yds at 10s 7¼ per E. E.
7¾ Pieces of Chints, each
47¾ Yds. at 4s. 6¼d.
Feb 11th. 4⅜ Pieces of Holland, each
25¾ E. Fl. at 3s 10d p. Y.
10¾ Pieces of Serge, each
19⅜ E. Fr. at 2s. 9¼d.
25th. 1749⅛ Yds of Kendal Cotton,
at 9¼d per E. Flemiſh
Mar. 1ſt. 947¼ Yds. of Mancheſter
Stuff, at 10¾d.

£.

10 Richmond, 1793.

Mr. Jackſon,

To Dormer and Pratt, Dr.

l. s. d.

Jan. 3d. Palm Sack, 12½ doz. at 2l 7. 8 p d
11th. Red Port, 1¾ Hhd. at 6s 9 p G
18th. Claret, ½ Hnd. at 10s. 10d.—
Feb 7th. Liſbon White, 31¼ Gal. at
1s. 10d. per Quart
16th. Rheniſh, 17¾ G. at 2s 7½d—
Mar. 1ſt, Sherry, 35½ G. at 6s 4d p. G

£.

Received March, 4th, 1793 the Contents, in full

J. Dormer.

11 London, March 2d. 1793.

Mr. Watſon,

Bought of T. Magrath & Co.

l. s. d.

47 Pieces of Shalloon, each 47⅛ Yds.
at 1s. 9½d. per E. Engliſh
16 Ps. of Camblet, each 39¼Y at 1s 6¼d—
27½—of Drugget, each 27¾—at 2s 2¼p E Fr
49—of Calimanco, each 34¼—at 1s 8½d—
19⅛—of Callico, each 42E.En at 2s 11½ p y
17—of Chints, each 41½E. E. at 4s 10¼d—

£.

March 4th. Received the Contents,
T. Magrath.

12 London, March 2d. 1793.

Mr. Gibſon,

Bought of George Hobſon

l. s. d.

16Cwt. 1qr. 19lb. Groſs of Sugar, Tare
124lb. at 3l. 10s. per Cwt. neat
21Cwt. 2qr. 17lb Groſs of ditto, Tare
137lb. at 4l. 4s. per Cwt. neat
19Cwt. 1qr 21lb Groſs of Raiſins, Tare
96lb. at 2l. 7s. per Cwt. neat
11Cwt. 3qr. 14lb. Groſs of Currants,
Tare 85lb. at 2l 10. 4 per Cwt neat
5Cwt 1qr 17lb Groſs of Pimento, Tare
47lb. at 5l 5s per Cwt neat
7Cwt 2qr 19lb Groſs of Ginger, Tare
74lb. at 5l 6s 6d per Cwt.

£.

13 Barnardcaſtle, March 4th. 1793.

Mr. Moore,

Bought of J. Ewbank, 5 Bags of Cotton

No.							*l. s. d.*
1.	5cwt	1.	14. Groſs, Tare	1qr	4.	at 4l 18 11 per Cwt. neat.	
2.	7	2	11	1	5½		
3.	4	3	9	0	21¼		
4.	5	0	4	1	19¾		
5.	6	2	17	2	14¾		

£

Received at the ſame Time the Contents,

J. Ewbank.

14 London, March 1ſt. 1793.

Francis Clark, Eſq.

No. *Bought of J. James,* 5 Butts of Currants.

1.	4Cwt 1qr 12lb Groſs, Tare 19lb per Cwt Trett 4lb per 104lb	at 2½l. per cwt neat.
2.	9Cwt 2qr 17lb Groſs, Tare 21lb per Cwt Trett 4lb per 104lb	
3.	8Cwt 3qr. Groſs, Tare 9lb. per Cwt. Trett 4lb. per 104lb.	
4.	7Cwt 0qr 11lb Groſs, Tare 47lb in the whole, Trett 4lb p 104	
5.	9Cwt 1qr 9lb. Groſs, Tare 7lb. per Cwt Trett 4lb per 104lb.	

£

BILLS of EXCHANGE, PROMISSORY, NOTES, RECEIPTS, &c.

INLAND BILLS of EXCHANGE.

Barnardcaſtle, November 28th. 1792.
Sir,

Pay Mr. Thomas Strange or Bearer one Hundred and Fifty Pounds, and place it to my Account,

To Mr. Saunders }
Merchant, London. }
C. Hartley.

London, December 4th. 1792.
Meſsrs. Jones and Co.

Pay William Simpſon or Bearer Ninety Pounds on Account,

Joſeph Dent.

50l. Briſtol, December 5th. 1792.

At Sight pay Mr. John Ruſſel the Sum of Fifty Pounds, the Value received of Mr. John Hill, and place it to Account, as per Advice from,

To Mr. John Kendal }
Grocer, Strand, London. }
John Hobſon.

300l. Newcaſtle, December 5th. 1792.

At Fifteen Days Sight, pay Mr. Richard Thrope, or Order the Sum of three Hundred Pounds, Value received of Mr. James Moore, and place it to Account, as per Advice from,

To Mr. John Harriſon,
Merchant, at Hull. } Richard Hutton

500l. Glaſgow, December 5th. 1792.

Two Months after Date, pay to Sir Charles Sykes, or Order, Five Hundred Pounds, Value received of the Right Hon. the Lady Dundas, and place it to Account, as per Advice from,

To Sir John Bet
Merchant, London. } Collin M' Donald.

FOREIGN BILLS of EXCHANGE.

For 571l. 18s Sterling, at 34s. 4d. Flemiſh per L. Sterling, at Uſance.

London, December 5th. 1792.

At Uſance pay this my firſt Bill of Exchange to Jacob Vanderbeighauſen, or Order, Five Hundred and Seventy One Pounds Eighteen Shillings Sterling at Thirty Four Shillings and Four Pence Flemiſh per L. Sterling, Value received of Samuel Jones Eſq. and place it to Account as per Advice from your humble Servant,

To Mr Van. Schwellyingberg
Merchant, Amſterdam. } Jam. Willis

For 7494 Guilders 14 Stivers at 35s. 4d. per L Sterling, at Uſance.

Amſterdam, June 2d. 1792.

At Uſance, pay this my ſecond Bill of Exchange, my firſt not Paid, to Charles Johnſon, or Order Seven Thouſand Four Hundred and Ninety Four Guilders, Fourteen Stivers, at Thirty Five Shillings and Four Pence Flemiſh per L. Sterling. Value received of Herman Vanbeck, and Place it to Account, as per Advice from,

Your humble Servant.

To James Hall Eſq.
Merchant in Hull. Simon Van Buſching

For 5000 Crowns at 4s. 3d. double Uſance.

Paris, September 17th. 1792.

At double Uſance, pay this my firſt Bill of Exchange to James Philips, or Order, the Sum of Five Thouſand Crowns, at Four Shillings and Three Pence each, Value received, and Place it to Account, as per Advice of

Your humble Servant.

To Mr. William King
Merchant, London. Jean du Faur.

For 1576 Pieces of Eight of Mexico, at 54½d each, at 3 Months.

Leghorn, February 14th. 1792.

Three Months after Date pay this my firſt Bill of Exchange to Mr. John La Motte or Order, One Thouſand Five Hundred and Seventy Six Pieces of Eight of Mexico, for the Value received of himſelf, at 54½d. Sterling per Piece, and place it to Account as per Advice from,

Your humble Servant,
To Mr. William Hints }
Merchant, London. } James Moreni.

For 1749l. 18s. Sterling, at 54¼d. per Ducat Banco, at Uſance.

London, April 17th. 1792.

At Uſance, pay this my third Bill of Exchange, my firſt and ſecond not paid, to Mr. Joſhua Sommers, or Order, One Thouſand Seven Hundred and Forty Nine Pounds Eighteen Shillings Sterling in Ducats, at Fifty Four Pence Farthing each, and place it to the Account of,

Your humble Servant,
To Mr. Michael Teſſoni }
Merchant at Venice. } James Lamb.

PROMISSORY NOTES.

I promiſe to pay to Chriſtopher Humphries or Order, the Sum of Fifty Pounds, on Demand, for Value received. Witneſs my Hand this fifth Day of July 1792.

5ol. Francis Brent.

Bromley, June 4th. 1792.

Three Months after Date, I promiſe to pay to Mr. William Simpſon, or Order the Sum of Twelve Pounds; Value received.

12l. James Surepay.

RECEIPTS.

Received June 4th. 1792 of Mr. John Wilkinſon, the Sum of Eighteen Pounds, in full of all Demands, by me,

18l. John Clay.

Received, December 5th. 1792 of Mr. Thomas Keith the Sum of Fifty Pounds Eleven Shillings and Six-Pence, for half a Years Rent, due at Michaelmas laſt to Mr. John Tempeſt. For whoſe uſe it is received by me,

5ol. 11s. 6d. John Faux.

Received July 11th. 1792 of Mr. John Elmer, the Sum of Twenty Pounds Nine Shillings, in part of Payment of Seventy Pounds, due to me on Bond from the ſaid John Elmer, I ſay received by me,

20l. 9s. Robert Foſter.

Received May 4th. 1792 of Mr. George Trueman, a promiſſory-note for the Sum of Twenty Five Pounds, payable to me, or Order, two Months after Date, which Sum, when paid is in full of all Demands. I ſay received by me,

25l. William Winch.

Received March 4th. 1792 of George Peacock, Executor of the laſt Will and Teſtament of John Porter, late of Bellerby in the County of York, deceaſed, the Sum of Five Hundred Pounds, in full of a Legacy bequeathed to me in and by the laſt Will and Teſtament of the ſaid John Porter, I ſay received in full of all Demands by me,

500l. Thomas Poor.

VULGAR FRACTIONS.

1. Fractions or broken Numbers are Parts of an Unit, and are expreſſed by two Numbers, placed one above the other, with a Line drawn between them, as $\frac{3}{4}$. The lower Number is called the *Denominator*, and ſhews how many Parts the Integer is divided into ; the upper Number is called the *Numerator*, and ſhews how many of thoſe Parts are meant by the Fraction.

2. *A proper Fraction* is that wherein the *Numerator* is leſs than the *Denominator*, as, $\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{4}$ &c.

3. *An improper Fraction* is that wherein the Numerator is greater than or equal to the Denominator, as $\frac{5}{4}$ or $\frac{6}{6}$

4. *A ſingle or ſimple Fraction* is that which conſiſts of but one Numerator and Denominator, as, $\frac{5}{6}$

5. *A compound Fraction*, or Fraction of a Fraction, conſiſts of two or more Fractions connected with the Word of, as, $\frac{1}{2}$ of $\frac{3}{4}$ of $4\frac{1}{8}$, &c.

6. *A mixed Number* is a whole Number with a Fraction annexed, as, $17\frac{1}{2}$ $14\frac{5}{8}$, &c.

7. *A complex Fraction* is a Fraction having a mixed Number for its Numerator or Denominator, or both, as, $\frac{\frac{3}{4}}{14}$ $\frac{1}{\frac{5}{6}}$ $\frac{2}{47\frac{1}{2}}$ $\frac{47\frac{1}{2}}{96}$ $\frac{\frac{5}{8}}{\frac{7}{8}}$ $\frac{42\frac{7}{8}}{87\frac{5}{8}}$ &c.

8. *The common Meaſure of a Fraction* is that which will divide both the Numerator and Denominator without a Remainder.

REDUCTION of VULGAR FRACTIONS.

PROP. 1

To find the greateſt common Meaſure of a Fraction.

RULE.

Divide the greater Term by the Leſs, and this Diviſor by the Remainder continually, till there is no Remainder, then the laſt Diviſor will be the greateſt common Meaſure of both Terms of the Fraction.

PROP. 2

To reduce Fractions to their loweſt Terms.

RULE.

Divide the Terms of the given Fraction by any Number that will divide them without a Remainder, and theſe Quotients again in the ſame Manner and ſo on till no Number greater than 1 will divide them. Or, divide both Terms by their greateſt common Meaſure.

PROP. 3

To reduce a whole Number to an equivalent Fraction of a given Denominator.

RULE.

Multiply the whole Number by the given Denominator and the Product will be the Numerator required.

PROP. 4

To reduce a mixed Number to its equivalent improper Fraction.

RULE.

Multiply the whole number by the Denominator of the Fraction, and to the Product add the Numerator; this Sum written above the Denominator, will form the Fraction required.

PROP. 5

To reduce an improper Fraction to its equivalent whole or mixed Number.

RULE.

Divide the Numerator by the Denominator, and the Quotient will be the whole or mixed Number required.

PROP. 6

To reduce a complex Fraction to a ſimple one.

RULE.

If the Numerator or Denominator be whole or mixed Numbers, reduce them to improper Fractions. Then multiply the Denominator of the lower Fraction into the Numerator of the upper for a new Numerator and the Denominator of the upper Fraction into the Numerator of the lower for a new Denominator.

PROP. 7

To reduce a compound Fraction to a ſimple one.

RULE.

If any of the propoſed Quantities be Integers mixed Numbers or complex Fractions, reduce them to their proper Terms. Then multiply all the Numerators together for a new Numerator, and all the Denominators for a new Denominator.

PROP. 8

To reduce Fractions of different Denominators to others of equal Value, having a common Denominator.

RULE.

RULE.

Reduce Integers, mixed Numbers, complex or compound Fractions to their proper Terms. Then multiply each Numerator into all the Denominators, except its own, for a new Numerator, and all the Denominators together for a new Denominator.

NOTE.

If both the Numerator and Denominator of any Fraction be multiplied, or divided by the ſame Number, the Fraction will retain its original Value.

PROP. 9

To find the proper Quantity or Value of a Fraction in the known Parts of an Integer.

RULE.

Multiply the Numerator by the Number of Parts of the next inferior Denomination, which makes one of the Denomination of your Fraction, and divide the Product by the Denominator, the Quotient will be the Value of the Fraction. If there be a Remainder, multiply it by the next inferior Denomination, and divide as before, &c.

PROP. 10

To reduce Coins, Weights, Meaſures, &c. into Fractions.

RULE

RULE.

Reduce the Coin, Weight, Meaſure, &c. into the loweſt Name mentioned, for a Numerator, under which ſet the Number of Parts contained in an unit of the Integer, to which the propoſed Fraction is to be reduced, for a Denominator.

PROP. 11

To reduce Fractions of one Denomination to Fractions of another Denomination of equal Value.

RULE.

From a leſs to a greater Denomination. Multiply the *Denominator* by all the Denominations, from that given to that ſought; and from a greater to a leſs Denomination, multiply the *Numerator* by all the Denominations from that given to that ſought.

EXAMPLES in REDUCTION.

PROP. 1

1. Find the greateſt common Meaſure to $\frac{342}{843}$.

2. Find the greateſt common Meaſure to $\frac{843}{450}$.

PROP.

PROP. 2

3. Reduce $\frac{374}{1680}$ to its loweſt Terms.

4. Reduce $\frac{410}{510}$ to its loweſt Terms.

5. Reduce $\frac{843}{1745}$ to its loweſt Terms.

PROP. 3

6. Reduce 12 to a Fraction.

7. Reduce 15 to an improper Fraction having 26 for its Denominator.

PROP. 4

8. Reduce $149\frac{5}{8}$ to an improper Fraction.

9. Reduce $375\frac{94}{99}$ to an improper Fraction

10. Reduce $17494\frac{3}{99999}$ to an improper Fraction.

11. Place 4 Sevens in ſuch a Manner that they may be equal to 78.

PROP. 5

12. Reduce $\frac{4790}{25}$ to a whole or mixed Number.

13. Reduce $\frac{1512}{108}$ to a whole or mixed Number.

PROP. 6

14. Reduce $\frac{34\frac{5}{8}}{84}$ to a ſimple Fraction,

15. Reduce $\frac{44}{147\frac{7}{8}}$ to a ſimple Fraction,

16. Reduce $\frac{247}{\frac{5}{8}}$ to a ſimple Fraction.

PROP.

PROP. 7

17. Reduce the $\frac{3}{4}$ of $\frac{2}{3}$ of $\frac{5}{8}$ of $\frac{97}{101}$ of $\frac{8}{13}$ to a ſingle Fraction.

18. Reduce $3\frac{5}{8}$ of $\frac{7}{8}$ of $\frac{27}{301}$ of 49 to a ſingle Fraction.

19. Reduce $3\frac{3}{8}$ of $\frac{47}{95}$ of $\frac{34}{15\frac{1}{8}}$ of 108 to a ſingle Fraction.

20. Reduce $\frac{34}{59}$ of $\frac{1}{3}$ of $\frac{51\frac{3}{8}}{37\frac{3}{4}}$ of 34 to a ſingle Fraction.

PROP. 8

21. Reduce $\frac{1}{4}$, $\frac{2}{3}$, $\frac{5}{8}$, and $\frac{7}{8}$ to a common Denominator.

22. Reduce $\frac{1}{2}$ of $\frac{1}{3}$ of $\frac{5}{8}$ and $\frac{3}{4}$ of $\frac{7}{8}$ of $\frac{3}{8}$ to a common Denominator.

23. Reduce $5\frac{1}{3}$, $3\frac{7}{8}$, $4\frac{1}{4}$, and $6\frac{5}{8}$ to improper Fractions, having a common Denominator.

24. Reduce $\frac{\frac{2}{3}}{15}$ [illegible] [illegible] and $\frac{5\frac{1}{2}}{3\frac{7}{8}}$ to ſimple Fractions, having a common Denominator.

PROP. 9

25. Required the Value of $\frac{5}{8}$ of a L.
26. Required the Value of $\frac{5}{8}$ of a Cwt.
27. Reduce $\frac{3}{4}$ of a lb. Avoirdupois to its proper Quantity.

28. What is the Value of $\frac{1}{2}$ of $\frac{6}{5}$ of a lb Troy

29. Reduce 3/8 of a League to its proper Quantity.

30. Reduce 5/8 of 3/4 of an Acre to its proper Quantity.

31. What is the Value of 5/8 of 15 Yards of Cloth?

32. What is the Value of 7/8 of a Ton of Wine?

33. What is the Value of 5/8 of a Butt of Beer?

34. What is the Value of 7/26 of a Year?

35. What is the Value of 5/8 of a Chaldron of Coals?

36. What is the Value of 7/8 of 13s. 4d?

PROP. 10

37. Reduce 15s. 11d. to the Fraction of a L.

38. Reduce 5 3/8d. to the Fraction of a Shilling.

39. Reduce 1Cwt. 2qr. 6lb. 3 oz. 8 7/8dr. to the Fraction of a Cwt.

40. Reduce 5 oz. 3 1/4dr. to the Fraction of a lb. Troy.

41. What Part of a Groat is 3/4 of three Halfpence?

42. What Part of 10cwt. 1qr. 12lb. is 8cwt. 1qr. 25lb. 1 oz. 7 3/8dr?

43. Reduce 3qr. 1n. to the Fraction of a Yard.

44. Reduce 2 Roods 15 Perches to the Fraction of an Acre.

PROP. 11

45. Reduce $\frac{5}{8}$ of a Penny to the Fraction of a L.

46. Reduce $\frac{7}{960}$ of a Pound to the Fraction of a Penny.

47. Reduce $\frac{4}{9}$ of a dwt. to the Fraction of a Pound Troy.

48. Reduce $\frac{1}{400}$ of a lb. Troy to the Fraction of a Dwt.

49. Reduce $\frac{5}{8}$ of a lb. Avoirdupois to the Fraction of a Cwt.

50. Reduce $\frac{1}{196}$ of a Cwt. to the Fraction of a lb.

ADDITION of VULGAR FRACTIONS.

RULE.

REDUCE mixed Numbers to improper Fractions; complex and compound Fractions to ſimple ones, and Fractions of different Denominators to a common Denominator. Then the Sum of the Numerator written over the common Denominator, will be the Sum of the Fractions required.

NOTE

NOTE.

If the Fractions are of different Denominations, reduce them to their proper Quantities.

EXAMPLES.

1. Add $\frac{3}{4}$, $\frac{5}{8}$ and $\frac{3}{8}$ together.
2. Add $\frac{1}{4}$ of $\frac{7}{8}$ and $5\frac{3}{8}$ together.
3. Add $\frac{2}{5}$, $7\frac{5}{8}$, $\frac{45}{94\frac{7}{8}}$, and $\frac{45\frac{7}{8}}{314\frac{5}{8}}$ together.
4. Add $\frac{5}{8}$ of a L. $\frac{3}{8}$ of a Shilling and $\frac{7}{8}$ of a Penny together.
5. What is the Sum of $\frac{3}{4}$ of 1l. 10s 0$\frac{1}{4}$d. of 3l. 10s. and $\frac{1}{8}$ of a hundred Guineas?
6. Add $\frac{3}{8}$ of a Ton to $\frac{7}{8}$ of a Cwt.
7. Add $\frac{1}{8}$ of an Acre, $\frac{3}{4}$ of 19 Square Feet and $\frac{3}{8}$ of a Square Inch together.
8. Add $\frac{1}{4}$ of a Week, $\frac{1}{2}$ of a Day and $\frac{1}{8}$ of an Hour together.

SUBTRACTION of VULGAR FRACTIONS.

Reduce as in Addition. Then the Difference of the Numerators, written above the common Denominator, will give the Difference of the Fractions required.

EXAMPLES.

1. What is the Difference between $\frac{3}{4}$ and $\frac{7}{8}$?
2. From $115\frac{5}{8}$ take $39\frac{7}{8}$.

3. What is the Difference between $\frac{3}{4}$ of 15 and $\frac{5}{8}$ of 72 ?

4. What Number is that to which if $7\frac{2}{3}$ be added the Sum will be $17\frac{3}{5}$?

5. What is the Difference between $\frac{3}{4}$ of a L. and $\frac{3}{8}$ of a Shilling ?

6. From $\frac{3}{8}$ of a lb. Troy take $\frac{5}{8}$ of an Ounce.

7 From $\frac{3}{4}$ of $\frac{3}{8}$ of a Hogſhead of Wine take $\frac{7}{8}$ of $\frac{1}{2}$ of a Pint.

MULTIPLICATION of VULGAR FRACTIONS.

Reduce as in Addition. Then multiply all the Numerators together for a new Numerator; and all the Denominators for a new Denominator.

EXAMPLES.

1. Multiply $\frac{3}{4}$ by $\frac{7}{8}$.
2. Multiply $\frac{875}{729}$ by 27
3. Required the Product of $7\frac{3}{4}$ by 25.
4. What is the Product of $\frac{3}{4}$ of $\frac{7}{8}$ of 15 and $\frac{14}{15}$ of $11\frac{5}{8}$?
5. Multiply 7 feet 9 in. by 3 f. 11 in. and that Product by 5 f. 3 in.

DIVISION of VULGAR FRACTIONS.

Reduce as in Addition. Then invert the Diviſor, and proceed as in Multiplication.

EXAMPLES.

1. Divide $\frac{16}{19}$ by $\frac{2}{7}$
2. Divide $\frac{25}{37}$ by 7.
3. Divide $\frac{3}{4}$ by $\frac{7}{8}$.
4. Divide $15\frac{3}{4}$ by $\frac{7}{8}$ of $\frac{2}{8}$.
5. Divide $\frac{51\frac{1}{8}}{95}$ by $\frac{71}{149\frac{7}{8}}$.
6. What Part of 108 is $\frac{7}{8}$ of an unit ?

DECIMAL FRACTIONS.

1. Decimal Fractions are ſuch as have 10, 100, 1000, &c. for their Denominator; thus $\frac{1}{10}$ $\frac{25}{100}$ $\frac{225}{1000}$ &c. are decimal Fractions; and theſe are expreſſed by writing the Numerator only, with a Point before it on the left Hand; thus, ·1, ·25, ·225, &c.

2. When the Numerator of a decimal Fraction is written without its Denominator, it muſt always conſiſt of as many Figures as there are Cyphers in the Denominator; thus, $\frac{5}{10}=\cdot5$, $\frac{5}{100}=\cdot05$, $\frac{5}{1000}=\cdot005$, &c. Hence the Denominator of a decimal Fraction is an Unit with as many Cyphers as there are Figures in the Decimal.

3. Cyphers on the right Hand of Decimals make no Alteration in their Value; thus, ·5, ·50, ·5000, &c. are Decimals of the ſame Value; for, $\frac{5}{10}\cdot\frac{50}{100}\cdot\frac{500}{1000}=\frac{1}{2}$ by the nature of Vulgar Fractions.

4. Cyphers on the left Hand of Decimals decreaſe their value; thus, ·5, ·005, ·0005, &c. $\frac{5}{10}$, $\frac{5}{1000}$, $\frac{5}{10000}$, &c,

5. A mixed Number is compoſed of a whole Number and a Decimal, which are ſeperated from each other by a Point; thus, 115·5 ſignifies $115\frac{5}{10}$.

ADDITION of DECIMALS.

RULE.

PLACE the Decimal points directly under each other, Tenths under Tenths, &c. Then add as in whole Numbers, and from the right

Hand of the Sum point off as many Figures for Decimals as are equal to the greateſt Number of Decimals in any of the given Numbers.

1. Add 3·754 + 47·5 + ·00857 + 37·5 together.
2. Add 54·34 + ·375 + 14·795 + 1·5 together.
3. Add 71·25 + 1·749 + 1759·5 + 3·1 together.

SUBTRACTION of DECIMALS.

RULE.

PLACE the leſs Number under the greater, the Point under the Point, &c. Then ſubtract as in whole Numbers.

1. What is the Difference between ·3054 and 3·075?
2. Required the Difference between 1745·3 and 173·45.
3. What is the Difference between ſeven tenths of an Unit and 54 ten thouſandth parts of an Unit?

MULTIPLICATION of DECIMALS.

RULE.

MULTIPLY the Decimals as if they were whole Numbers, and from the Product cut off as many Decimals as there are in both the Multiplier and Multiplicand. If there are not ſo many Places in the Product, ſupply the defect by prefixing Cyphers to the left Hand.

1. Multiply 473·54 by ·057.
2. Multiply 137·549 by 75·437.
3. Multiply 3·7495 by ·73487.
4. Multiply ·04375 by ·47134.

CONTRACTED MULTIPLICATION of DECIMALS.

RULE.

PUT the Units place of the Multiplier under that place of the Multiplicand, which you intend to keep in the Product, and *invert* the Order of all the other Figures. In multiplying, always begin with that Figure of the Multiplicand which ſtands directly over the Multiplying digit, and ſet the firſt Figure in every Product in a right Line under each other to the right Hand, obſerving to increaſe the firſt Figure of every Line with what

what would ariſe, by carrying 1 from 5 to 15, 2 from 15 to 25, 3 from 25 to 35, &c. from the two Figures, in the Multiplicand, on the right Hand of the multiplying digit.

1. Multiply 2·38645 by 8.2175, and let there be only four places of Decimals in the Product.

2. Multiply 54·7494367 by 4·724753 retaining only five places of Decimals in the Product.

3. Multiply 475·710564 by ·3416494 retaining three Decimals in the Product.

DIVISION of DECIMALS.

RULE.

DIVIDE as in whole Numbers, and from the right Hand of the Quotient, point off as many Decimal places, as thoſe of the Dividend exceed thoſe of the Diviſor. But if the Quotient does not contain ſuch a Number of Figures, as is equal to the Exceſs, the Defect muſt be ſupplied with Cyphers to the left Hand.

1. Divide ·475321 by 97·453.
2. Divide 475·321 by ·97453.
3. Divide 17·543275 by 125·7.
4. Divide 143754·35 by ·7493.
5. Divide ·000177089 by ·0374.
6. Divide 16 by 960.

CONTRACTED DIVISION.

RULE.

THE firſt Figure in the Quotient muſt always be the ſame Name or Value with that of the Dividend which anſwers or ſtands over the Units Place of the Diviſor.

Make uſe of as many Figures in the Diviſor, reckoning from the left Hand towards the Right, as you intend to have in the Quotient. Let each Remainder be a new Dividend, and for every ſuch new Dividend, leave out one Figure to the right Hand of the Diviſor, obſerving to carry for the Increaſe, of the Figures cut off as in contracted Multiplication.

1. Divide ·3754 by 75·714 and let the Quotient contain only four Places of Decimals.
2. Divide 754·347385 by 61·34775 and let the Quotient contain only three Places of Decimals.
3. Divide 59 by ·74571345, and let the Quotient contain four Places of Decimals.
4. Divide 17493·407704962 by 495·783269 and let the Quotient contain four Places of Decimals.

REDUCTION of DECIMALS.

PROP. 1

To reduce a Vulgar Fraction to a Decimal of equal Value.

RULE.

Divide the Numerator by the Denominator and the Quotient will be the Anſwer.

PROP. 2

To reduce Numbers of different Denominations, as Coins Weights, &c. into Decimals.

RULE.

Reduce the given Money, Weights, &c. into the loweſt Denomination mentioned for a Dividend; then reduce the Integer into the ſame Denomination for a Diviſor the Quotient will be the Anſwer. Or Write the given Denominations or Parts, regularly under each other, proceeding from the loweſt Denomination to the higheſt; let theſe be the Dividends, Oppoſite to the Dividends, on the left Hand, place ſuch Numbers for Diviſors as will reduce them to the next ſuperior Names and write the *Quotients of each*, *as Decimal Parts.*

PROP. 3

To find the Value of any Decimal Fraction.

RULE

RULE.

Multiply the given Decimal by the Number of Parts contained in the next inferior Denomination; and from the right Hand of the Product, point off as many Figures as the given Decimal conſiſts of. Multiply the remaining Decimals by the Parts of the next inferior Name, cut off as before, and thus proceed to the leaſt known Parts of the Integer.

PROP. 1

1. Reduce $\frac{7}{8}$ to a Decimal.
2. Reduce $\frac{5}{8}$ to a Decimal.
3. Reduce $\frac{1}{243}$ to a Decimal.
4. Reduce $\frac{3}{4}$ to a Decimal.

PROP. 2

5. Reduce 18s. 9$\frac{3}{4}$ to the Decimal of a L.
6. Reduce 7s. 5$\frac{1}{2}$d. to the Decimal of a L.
7 What Decimal Part of a L. is three halfpence.
8. Reduce 4s. 7$\frac{5}{8}$d. to the Decimal of a L.
9. Reduce 1 oz. 11dwt. 3gr. to the Decimal of a Pound Troy.
10. Reduce 24 Grains to the Decimal of an oz. Troy.
11. Reduce 5 oz. 4dwts. Avoirdupois to the Decimal of a lb. Troy.
12. Reduce 3Cwt. 1qr. 14lb. to the Decimal of a Ton.

13. Reduce 2qr. 15lb. to the Decimal of a Cwt.

14. Reduce 3 Buſhels 3 Pecks to the Decimal of a Chaldron of 32 Buſhels.

15. Reduce 2·45 Shillings to the Decimal of a L.

PROP. 3

16. Required the Value of ·03125 of a L.

17. What is the Value of ·7575 of a L?

18. Required the Value of ·75435 of a Shilling.

19. What is the Value of ·375 of a Guinea?

20. What is the Value of ·4575 of a Cwt?

21. What is the Value of ·1 5 of a Ton?

22. What is the Value of ·05875 of a lb. Avoirdupois?

23. Required the Value of ·02575 of a lb. Troy?

24. Required the Value of ·075 of a Yard.

25. Required the Value of ·475 of an Engliſh Ell.

26. What is the Value of ·04535 of a Mile?

REPEATING of CIRCULATING DECIMALS.

1. When the Denominator of a Vulgar Fraction, in its loweſt Terms is not compounded of 2 or 5 or both, the Decimal produced

duced from ſuch a Vulgar Fraction will be infinite; it is called a Repetend, or circulating Decimal, from a continued Repetition of the ſame Figures.

2. *A ſingle Repetend* is a Decimal where only one Figure repeats, as ·222, &c. or ·333, &c.

3. A compound Repetend has the ſame Figures circulating alternately, as ·575757, &c. or ·57235723, &c. and may be denoted by marking the firſt and laſt Figure, thus ·5'7', and ·5'723'.

4. *Pure Repetends* are ſuch as have no Figures in them but what belong to the Repetend; as, 3', 5', 4'73', &c.

5. *Mixed Repetends* are ſuch as have Cyphers, or ſignificant Figures, between the Repetend and the Decimal Point, or ſuch as have whole Numbers to the left Hand of the Decimal Point; as, ·0'4', ·07'54', ·47'3', 2·6'95', 71·21'78'.

6. *Diſſimilar Repetends* are ſuch as begin at different Places from the Decimal Points; as, ·2'53', ·4'65', &c.

7. *Similar Repetends* are ſuch as begin at an equal diſtance from the Decimal Points; as, ·35'4', ·37'53', &c.

8. *Conterminous Repetends* are ſuch as end at the ſame diſtance from the Decimal Points; as, ·12'5', ·3'54', &c.

9. ***Similar and Conterminous Repetends*** are ſuch as begin and end at the ſame Place after the Decimal Points; as, 53·27'53', 4·63'27', and ·58'72', &c.

REDUCTION of CIRCULATING DECIMALS.

PROP. 1

To reduce a pure Repetend to its equivalent Vulgar Fraction.

RULE.

Under the given Decimal, place as many Nines as there are Figures in the Repetend, and reduce the Fraction to its loweſt Terms.

1. Required the leaſt equivalent Vulgar Fractions to ·3' and ·135'.

2. Required the leaſt equivalent Vulgar Fractions to ·6', ·162', ·7'69230', ·945, and ·0'9'.

PROP. 2

To reduce a mixed Repetend to its equivalent Vulgar Fraction.

RULE.

From the given mixed Repetends ſubtract the finite Numbers for a Numerator, and to the right Hand of as many Nines as there are pure Repetends annex as many Cyphers as there are finite Decimals for a Denominator. Then reduce this Fraction to its loweſt Terms.

3. Required the leaſt equivalent Vulgar Fractions to 2·41'8', ·59'25', ·0084'97133', and ·53'.

ADDITION of CIRCULATING DECIMALS.

RULE.

MAKE the Repetends ſimilar and conterminous, and collect them into one Sum, as finite Decimals obſerving to carry to the firſt row, the Tens that would ariſe from the next Figures of the Repetend.

EXAMPLES.

1. Add ·125', 4·1'63', 1·7'143', and 2·5'4', together.

2. Add 67·34'5', 9·6'51', ·2'5'. 17·47', and 5', together.

3. Add ·4'75', + 3·754'3', + 64·7'5', + ·5'7', + ·17'88', together.

SUB-

SUBTRACTION of CIRCULATING DECIMALS.

RULE.

MAKE the Repetends ſimilar and conterminous and ſubtract as finite Decimals.

EXAMPLES.

1. From 11·47’5’, take 3·457’35’.
2. From 47·53’, take 1·7’57’.
3. From 17·5’73’, take 14·57’.
4. From 17·43’, take 12·345’.

MULTIPLICATION of CIRCULATING DECIMALS.

PROP. 1

When the right Hand Figure of the Multiplicand is a ſingle Repetend and the Multiplier a finite Number.

RULE.

IN Multiplying increaſe the right Hand Figure of each reſulting Line by as many Units as there are Nines in the Product of the firſt Figure in that Line, and the right Hand Figure of each Line will be a Repetend: make them all end at the ſame Place, and add them together.

EXAMPLES.

1. Multiply 4·253' by ·257.
2. Multiply ·3754' by 14·75.
3. Multiply 4·753' by 7·437.

PROP. 2

When the Multiplicand is a compound Repetend, and the Multiplier a finite Number.

RULE.

Set the repeating Figures twice over, Multiply the ſecond Period mentally, and carry the Tens, contained in the Product of the left Hand Figure of the firſt Period; then multiply the reſt of the Figures in the Multiplicand as in common Multiplication. Proceed thus with each Figure in the Multiplier, and every Product will contain Repetend, laſtly make every Product conterminous before you add them together.

EXAMPLES.

4. Multiply ·42'53' by 2·57.
5. Multiply ·37'54' by 17·43.
6. Multiply 4·73'5' by 7·349.

PROP. 3

When the Multiplicand is a finite Number, and

and the right Hand Figure of the Multiplier a ſingle Repetend.

RULE.

Multiply by the circulating Figure as if it were a finite Digit; divide this Product by 9 and continue the Quotient till it becomes a ſingle Circulate, if the Product does not divide even by 9 Proceed with the remaining Figures in the Multiplier (if any) as in common Multiplication.

EXAMPLES.

7. Multiply ·437 by 3·75’.
8. Multiply 1·475 by 1·754’.
9. Multiply 173·715 by 3·7545’.

PROP. 4

When the Multiplicand is a finite Number, and the Multiplier a compound Repetend.

RULE.

If the Multiplier be a mixed Repetend, ſubtract the finite Decimal from it, and with the Remainder proceed as in common Multiplication, and add the ſeveral Products together. Then ſet the left Hand Figure of this Sum under its third, fourth, fifth, &c. Figure towards the right Hand, according as the Repetend conſiſts of two, three, four, &c. Places and the reſt in order after it; proceed thus till the Figure laſt added falls beyond *that* firſt added. Laſtly collect theſe Numbers into one Sum in the order they are placed, and mark as many Figures for a Repetend as the Repetend of the Multiplier conſiſts of.

Examples.

10. Multiply 4·573 by ·37’5’.
11. Multiply 4·573 by ·3’75’.
12. Multiply 4·7157 by 3·7’543’.

PROP. 5

When the Multiplicand and Multiplier are each a ſingle Circulate.

RULE.

Multiply as in Prop. 1. and 3.

Examples.

13. Multiply 3·456’ by ·425’.
14. Multiply 4·57’ by 2·45’.
15. Multiply 3 745’ by 1·47’.

PROP. 6

When the Multiplicand is a compound Repetend, and the Multiplier a ſingle recurring Digit.

RULE.

Multiply as in Prop. 2. and 3.

Ex-

EXAMPLES.

16. Multiply 1·4'56' by 4·23'.
17. Multiply 573'4' by 1·573'.
18. Multiply ·41'32' by 1·432'.

PROP. 7

When the Multiplicand is a ſingle and the Multiplier a compound Repetend.

RULE.

Multiply as in Prop. 1. and 4.

EXAMPLES.

19. Multiply 45·13' by ·2'45'.
20. Multiply 3·537' by 2·4'5'.

PROP. 8

When the Multiplier and Multiplicand are both compound Repetends.

RULE.

Proceed as in Prop. 2. and 4.

EXAMPLES.

21. Multiply 7·7'2' by ·2'97'.
22. Multiply ·2'97' by 7·7'2'.

DIVISION of CIRCULATING DECIMALS.

PROP. 1

When the Dividend is a ſingle or compound Repetend and the Diviſor a finite Number.

RULE.

DIVIDE as if both the Numbers were finite; only inſtead of bringing down Cyphers, bring down the repeating Figure or Figures, and continue the Quotient till it repeats or is ſufficiently exact.

EXAMPLES.

1. Divide 56 6' by 137.
2. Divide 24·31'8' by 1·792.
3. Divide 7·54'03' by 14.25.

PROP. 2

When the Diviſor is a ſingle or compound Repetend and the Dividend a finite Number.

RULE.

If the Diviſor be a mixed Repetend annex as many Cyphers to the right Hand of the Dividend as there are pure Repetends in the Diviſor. Write this Dividend and Diviſor in the order of Diviſion; under theſe write them

them a ſecond time each removed as many Figures towards the right Hand as there are pure Repetends in the Diviſor ; ſubtract each lower Line from that above it, and the Remainder will be a new Diviſor and Dividend, both finite Numbers. If the Diviſor be a pure Repetend the Dividend *only* muſt be ſubtracted after the Cyphers are annexed to it.

EXAMPLES.

4. Divide 8·5968 by ·24'5'.
5. Divide 2·295 by ·2'97'.
6. Divide 47·345 by 1·7'59'.

PROP. 3

When both the Diviſor and Dividend are ſingle or compound Repetends.

RULE.

If they are diſſimilar mixed Repetends make them ſimilar and conterminous, and ſubtract the finite Numbers from each of them, the Remainders will be finite Numbers. If the Diviſor and Dividend are both pure Repetends make them conterminous and Divide them like finite Numbers.

EXAMPLES.

7. Divide 13·5'169533' by 4·2'97'.
8. Divide ·4'5' by ·1'18881'.
9. Divide ·4'75' by ·37'53'.
10. Divide 3·7'53 by ·2'4'.

The RULE of THREE DIRECT and INVERSE and COMPOUND PROPORTION in VULGAR and DECIMAL FRACTIONS.

OBS.

No Rules are neceſſary but what have already been given.

EXAMPLES.

1. If ⅝ of a Yard coſt ¾ of a L. what will ⅛ of an Ell Engliſh coſt?

2. If ⅞ of an Engliſh Ell coſt 10s. 2d. ⅜ what will ⅜ of a Yard coſt?

3. If ¾ of a lb. coſt 7s. 9d. what will 54⅝lb. coſt?

4. If ⅜ of ⅝ of 15 Ells of Holland coſt 2⅛l. what will ¾ of 175 yds. coſt at the ſame rate?

5. If 24⅜ Shillings will pay for the Carriage of a Cwt. 137⅜ Miles, how far may 5⅜ Cwt. be carried for the ſame Money?

6. How many Yards of Matting, ¾ of a yd. wide will be ſufficient to cover a Floor that is 15½ Feet broad and 27¾ Feet long?

7. If 3½l. be the Wages of 13 Men for 7½ Days what will be the Wages of 20 Men for 15¼ Days?

8. What is the Intereſt of 490l. 15s. for 7¾ Years at 4½ per Cent per Annum?

9. If a Footman travel 294 Miles in 7⅜ days of 12½ Hours long, in how many days of 10 Hours each will he travel 147⅛ Miles

SIM

SIMPLE INTEREST.

1 INTEREST is the Premium, or Money which one Perſon allows to another for the uſe of any Sum of Money for a determinate ſpace of Time.

2. The *Principal* is the Money lent.

3. The *Rate per Cent* is a certain Sum agreed on between the Borrower and the Lender, to be paid for the uſe of every 100l. in the Principal for a Year.

4. The Amount is the Principal and its Intereſt added together.

5. Simple Intereſt is the Money ariſing from the Principal only, though ſuch Intereſt ſhould remain unpaid for any Number of Years. Suppoſe the Intereſt of 100l. for one Year be 5l. for two Years it will be 10l. &c.

PROP. 1

When the Time is given in Years.

RULE.

Multiply the Principal by the Rate per Cent, and that Product by the Numbers of Years. Then divide by 100 and the Quotient will be the Intereſt.

1. Required the Intereſt of 349l. 10s. for 7 Years at 4 per Cent per Annum.

2. What is the Intereſt of 625l. 15s. for 3½ Years at 4 per Cent per Annum?

3. What is the Intereſt of 494l. 13s. 9d. for 5¾ Years at 5 per Cent per Annum ?
4. Required the Intereſt of 500l. 15s. for 5½ Years at 4½ per Cent per Annum ?

PROP. 2

When the Time is given in Days.

RULE.

As 365 Days are to the Intereſt of the given Sum for a Year, ſo are the Days given to the Intereſt required. Or Reduce the Principal into the loweſt Denomination contained in it, then multiply it by the Number of Days, and that Product by the Rate per Cent for a Dividend : let this Dividend be divided by 36500 and the Quotient will be the Anſwer in the ſame Denomination as the Principal was reduced to.

EXAMPLES.

5. Required the Intereſt of 194l. 11s. 6d. for 315 Days, at 4½ per Cent per Annum.
6. Required the Intereſt of 494l. 12s. 10d. for 29 Weeks at 5 per Cent per Annum.
7. Required the Intereſt of 540l. 10s. from January 1ſt. 1792 to September 22d. in the ſame Year, at 4 per Cent per Annum.

PROP. 3

When the Time is given in Years and Months; or Years, Months and Days.

RULE

RULE.

Find the Intereſt for the Years by the firſt Rule and work for the Months and Days by the aliquot Parts of a Year and a Month.

EXAMPLES.

8. Required the Intereſt of 500 Guineas for 5 Years 9 Months and 27 Days, at 4¾ per Cent per Annum.

9. A Gentleman left his Daughter by Will 875l. 10s. to be paid her when ſhe is 21 years of Age, with Intereſt at 5 per Cent per Annum; now ſhe is 18 years 7 months 3 days old at her Father's Deceaſe reckoning 12 Months to a Year and 30 Days to a Month. What will be the Amount of her Fortune when ſhe comes of Age.

PROP. 4

When the Amount, Time, and Rate per Cent are given to find the Principal.

RULE.

As the Amount of 1l. at the Rate and for the Time given is to 100l. ſo is the Amount given to the Principal.

EXAMPLES.

10. What Principal put to Intereſt for 5 Years, will amount to 570l. 16s. 6d. at 4 per Cent per Annum.

11. What Principal put to Intereſt for 3¾ Years at 4½ per Cent per Annum, will Amount to 205l. 11s. 7¾d. ⅜?

PROP. 5

When the Amount Principal and Time are given to find the Rate per Cent.

RULE.

As the Principal is to its Intereſt for the whole Time, ſo is 100l. to its Intereſt for the ſame Time. Divide this Intereſt by the Time and the Quotient will be the Rate per Cent.

12. At what Rate per Cent will 344l. 15s. Amount to 465l. 8s. 3d. in 7 Years.

13. At what Rate per Cent will 175l. 18s. Amount to 205l. 11s. 7¼d. ⅜ in 3¼ Years.

PROP. 6

When the Principal Rate per Cent and Amount are given to find the Time.

RULE.

As the Intereſt of the Principal for one year, at the given Rate, is to one year, ſo is the whole Intereſt to the Time required.

EXAMPLES.

14. In what Time will 475l. 13s. 9d. Amount to 570l. 16s. 6d. at 4 per Cent per Annum?

15. In what Time will 175l. 18s. Amount to 205l. 11s. 7¼d. ⅜ at 4½ per Cent per Annum.

BRO-

BROKAGE or BROKERAGE.

BROKAGE is an Allowance of ſo much per Cent made to Perſons called Brokers; who from their Knowledge of Merchants and different Branches of Commerce are generally employed in buying or ſelling Goods for others.

RULE.

Divide the given Sum by 100, and take Parts from the Quotient with the Rate per Cent.

EXAMPLES.

1. Suppoſe I employ a Broker to ſell Goods for me to the Amount of 715l. 15s. what is his Allowance at 3s. 9d. per Cent?
2. When a Broker ſells Goods for me to the Amount of 7134l. 15s. 10d. what may he demand for Brokerage if he is allowed 5s. 9d per Cent
3. What is the Brokerage of 2947l. 15s. 6d at ⅛ L. per Cent.

COMMISSION.

COMMISSION is an Allowance made by Merchants to their Factors or Agents in foreign Countries for buying or ſelling Goods; and is generally at a certain Rate per Cent, according to the Cuſtom of the Country where the Factors reſide.

EXAMPLES.

1. If I empower my Factor to purchaſe Goods for me to the Amount of 500l. 14s. what does his Commiſſion come to at $2\frac{1}{2}$ per Cent?

2. My Factor informs me that he has bought Goods on my Account to the Amount of $757^{l.}$ 14s. what comes his Commiſſion to at $3\frac{3}{4}$l. per Cent?

3. My Factor informs me that he has ſold Goods on my Account to the Amount of 500l. 17s. what comes his Commiſſion to at $2\frac{3}{4}$l. per Cent?

INSURANCE.

INSURANCE is a Security given in Conſideration of a Premium of ſo much per Cent paid down by the Proprietors of Goods, &c. to the Inſurers whereby they engage to anſwer for the Loſs or Damage of Ships, Houſes, Goods, &c. by Storms, Fires, or other Accidents.

EXAMELES.

1. What Premuim muſt be paid for an Inſurance of Goods to the Amount of 500l. 14s at $2\frac{1}{2}$ per Cent?

2. What Premium muſt be paid for inſuring Goods to the Amount of 715l. 15s. at 3s. 9d. per Cent?

3. What Premium muſt be given as a pledge for the Inſurance of an Eaſt India Ship and Cargo valued at 47575l. 18s. when the Rate of Inſurance is 17⅞ per Cent?

PURCHASING of STOCKS.

STOCK is a general Name for the Capitals of our trading Companies and the Money borrowed by Government, at ſo much per Cent, to defray the Expences of the Nation.

EXAMPLES.

1 What muſt be given for 750l. 16s. in the 3 per Cent. Annuities, when 64⅛l. will buy 100l?

2. What is the Purchaſe of 540l. 16s. Bank-ſtock at 112⅝ per Cent?

3. What is the Purchaſe of 7575l. 15s. Bankſtock at 125⅜ per Cent?

4. Required the Purchaſe of 900l. South Sea Stock at 89¼ per Cent.

DISCOUNT.

DISCOUNT or Rebate is an Allowance made for the Payment of any Sum of Money before it becomes due: and the preſent worth of any Sum or Debt, is ſuch a Sum as if put to Intereſt for the Time, and at the Rate for which the Diſcount is to be made, would amount to the Sum, or Debt, due.

RULE.

As the Amount of 100l. for the given Rate and Time, is to 100l. ſo is the given Sum to its preſent Worth. The Difference between the given Sum and its preſent Value will give the Diſcount. Or as the Amount of 100l. for the given Rate and Time, is to the Intereſt of 100l. for that Time, ſo is the given Sum to the Diſcount.

EXAMPLES.

1. What is the preſent worth and Diſcount of 550l. 10s. for 9 Months at 5 per Cent per Annum?

2. Required the preſent worth of 594l. 14s 9d. due 8 Months hence, Diſcount at 5¼ per Cent per Annum?

3. Sold Goods to the Value of 915l. 17s. payable 7 Months hence; what muſt I allow for preſent Payment at 8 per Cent per Annum?

4. How much ready Money ſhould I have for a Note of 75l. which would be due 19 Months hence if I allow a Diſcount of 5l. per Cent per Annum ?

5. If a Legacy of 900l. be left me on the 22d. of September, to be paid at Chriſtmas, what muſt I receive if I allow 6 per Cent per Annum Diſcount for preſent payment ?

6. What is the Diſcount of 15000l. for 57 Days at 7⅝ per Cent per Annum ?

7. Sold Goods to the Value of 747l. 18s. one third of which is due immediately ¼ at the end of 7 Months, and the Reſt at 10 Months, what ready Money ought I to receive if I allow a Diſcount of 8⅜ per Cent ?

EQUATION of PAYMENTS.

WHEN ſeveral Debts are payable at different Times, bearing no Intereſt till after the Time of Payment, the finding of a Time, at which, if they are all paid together, neither the Debtor nor the Creditor will ſuffer Loſs, is called Equating, or reducing the Times of Payment to one.

RULE

RULE.

Multiply each Payment by the Time at which it becomes due; then divide the Sum of the Products by the Sum of the Payments, and the Quotient will be the Time required.

EXAMPLES.

1. A owes B. 110l. whereof 50l. is to be paid at 2 Year's end, 40l. at $3\frac{1}{2}$ Year's end, and 20l. at $4\frac{1}{2}$ Year's end; at what Time may B receive the whole at once?

2. A Debt of 500l. is to be diſcharged, viz. 100l. at 2 Months, 200l. at 4 Months and the reſt at 6 Months what is the equated Time for the Value of the whole?

3. A Debt of 700l. is to be diſcharged thus, 150l. preſent, 300l. at 6 Months, 200l. at 10 Months and the reſt at 12 Months; what is the equated Time for the Payment of the whole?

COMPOUND INTEREST.

COMPOUND Intereſt is that which is produced not only from the Sum of Money lent as the Principal, but alſo from the Intereſt, which (when unpaid) as it becomes due, is added to the Principal.

RULE.

t of the given Principal for
firſt Payment by ſimple In-
ſider this Amount as the
ſecond Payment, and find its
ore. Proceed thus through
, always conſidering the laſt
Principal of the next Pay-
e given Principal, or Money
from the laſt Amount, the
be the Intereſt required.

EXAMPLES.

Compound Intereſt of 357l.
at 5 per Cent per Annum?
Compound Intereſt of 700l.
at 5 per Cent per Annum?
eral Amounts of 500l. pay-
yearly and quarterly being
rs at 5 per Cent per Annum.

L O P.

SHI al Rule by
Amou ants, &c. trad-
npany Stock, are ad-
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tional part of the Loſs according to the Money he has advanced in the Stock and the Time of its Continuance *therein.*

SINGLE FELLOWSHIP.

SINGLE Fellowſhip is when different Stocks are employed for any certain equal Time. The Effects of Bankrupts are by this Rule properly divided among their Creditors; Legacies adjuſted in Deficiences of Aſſets, &c. It likewiſe teaches us to divide any given Number into unequal Parts, proportional to certain other given Numbers.

RULE.

As the whole Stock is to the whole Gain or Loſs, ſo is each Man's particular Stock to his particular ſhare of the Gain or Loſs. Or, Divide the whole Gain, Loſs, or Sum to be proportionally divided by the whole Stock or Sum of the given Numbers and the Quotient will be a common Multiplier, by which multiply every Man's particular Stock or ſingle Number, and the Products will be the proportional Shares of Gain, Loſs, &c.

EXAMPLES.

1. Three Merchants, A, B and C enter upon a joint Adventure; A puts into the common Stock 250l. 10s. B 300l 15s. and C 410l 18s. after all Expences were paid, a clear Gain of 327l. 11s. 6d. was to be divided amongſt them; what was each Merchant's Share?

2. Two Merchants trade together; A put into the Stock 500l. 17s. 10d. and B 700 Guineas; they gained 300l. 15s. what is each Perſon's Share thereof?

3. Four Merchants A, B, C and D, entered into Partnerſhip with a Stock of 5075l. 18s, of which A contributed 574l. 16s. B 947l. 18s. 6d. C 3044l. 17s. and D the reſt; they gained 1358l. 18s. what was each Perſon's Share thereof?

4. The Money and Effects of a Bankrupt, after every unavoidable Expence is deducted, amount to 7174l. 14s. at this Time he is indebted to A 540l. 14s. to B 770l. 18s. to C 4005l. 14s. to D 975l. 18s. 9d. and to E 3000 Guineas, how muſt it be divided amongſt them, and what will they receive in the Pound?

DOUBLE FELLOWSHIP.

DOUBLE Fellowſhip is that which ſuppoſes the ſeveral Stocks, advanced for the Purpoſes of Trade, to be continued, for unequal Times, or to be encreaſed or diminiſhed at pleaſure with the Conſent of the ſeveral Partners, at any Time during the Continuance of ſuch Partnerſhip.

RULE.

Multiply each Man's Stock by the Time of its Continuance, and then proceed as in ſingle Fellowſhip.

EXAMPLES.

1. Three Merchants, A, B, and C, enter into Partnerſhip; A puts in 89l. 5s. for 5 Months, B 92l. 15s. for 7 Months, and C 38l. 10s. for 11 Months, with this Stock they traffic and gain 86l. 16s. Required each Perſon's Share of the Gain in proportion to his Stock and the Time of its Continuance?

2. Three Merchants A, B and C engage in Partnerſhip; A puts in 547l. 19s. 6d. for 7 Months, B 475l. 18s. for 9 Months and C 1747l. 14s. for 4 Months; they trade and gain 225l Required each Perſon's Share thereof?

3 Four Farmers A, B, C and D jointly hired a paſture of a Neighbour for 20 Guineas, into which A turned 7 Oxen for 13 Days, B 9 Oxen for 14 Days, C 11 Oxen for 27 Days and D 15 Oxen for 37 Days; how much muſt each Farmer pay for his Share of the Paſture?

LOSS and GAIN.

LOSS and Gain is a Rule that diſcovers what is gained or loſt in the buying or ſelling of Goods; and inſtructs the Merchant, or Trader to raiſe or lower the Price of his Goods ſo as to gain or loſe ſo much per Cent, &c.

PROP. 1

Given the Prime Coſt and ſelling Price of an Integer to find the Gain or Loſs.

RULE.

Calculate the Value of the Prime Coſt and ſelling Price, and the Difference will be the Gain or Loſs.

PROP. 2

To find the Gain or Loſs per Cent.

RULE.

As the Prime Coſt of an Integer is to 100l. ſo is the advanced or reduced Price of ſuch Integer to a fourth Number which, if greater than 100l. the Exceſs will be the Gain; but if leſs than 100l. the Defect will be the Loſs per Cent.

PROP. 3

Given the Prime Coſt of an Integer and the propoſed Gain or Loſs per Cent, to find the ſelling Price of ſuch Integer.

RULE.

As 100l. is to 100l. with the Gain added to it, or the Loſs ſubtracted from it, ſo is the Prime Coſt of an Integer to the required Price per Integer.

PROP. 4

Given the Price of an Integer with the Gain or Loſs per Cent, by ſuch a Price; to find the Gain or Loſs at any other Price.

RULE.

As the given Price of an Integer is to 100l. with the Gain per Cent added to, or the Loſs ſubtracted from it, ſo is the propoſed Price to a fourth Number which if greater than 100l. the Exceſs will be Gain; but if leſs, the Defect will be the Loſs per Cent.

PROP. 5

Given the Price at which an Integer of any Quantity of Goods is ſold, and the Gain or Loſs per Cent by ſuch Sale, to find the whole Gain or Loſs.

RULE.

Calculate the whole Value of the ſelling Price per Integer. Then as 100l with the Gain per Cent added to it, or Loſs ſubtracted from it, is to 100l. ſo is the whole Value at which the Goods were ſold to the whole Prime Coſt. The Difference between the Selling Price and Prime Coſt will be the Gain or Loſs.

PROP.

PROP. 6

Given the Prime Coſt of an Integer of any Quantity of Goods and the Gain or Loſs per Cent by the whole Quantity, to find the whole Gain or Loſs.

RULE.

Calculate the Value of the Goods at the Prime Coſt. Then as 100l. is to 100l. with Gain added, or Loſs ſubtracted from it, ſo is the whole Value of the Goods, at Prime Coſt, to the Value at the Gain or Loſs per Cent propoſed. The Difference will be the whole Gain or Loſs.

EXAMPLES.

1. Bought 15 Cwt. of Cheeſe at 1l. 11s. 6d. per Cent, which I ſold by Retail at 4½d per lb. what ſhall I gain or loſe by ſo doing?

2. If I buy 240 Eggs, viz. ½ at 3 for a penny, and the other ½ at 2 a penny whether ſhall I gain or loſe, if I mix them together and ſell them at 5 for 2d?

3. If Wine is bought at 7s. 6d. per Gallon and ſold for 10s. what is gained per Cent?

4. A Merchant has a Quantity of damaged Tobacco, which including all Expences ſtands him in 17¼d. per lb. what will he loſe per Cent by a Sale at 13½d. per lb?

5. Bought a Quantity of Goods for 60l. and ſold them again for 75l. what was the Gain per Cent?

6. Bonght Muſlin at 4s. 8d. per Yard; at what Price muſt I ſell it per Yard to gain 12½ per Cent?

7. A Mancheſter Man bought a Quantity of Yarn at 6s. per Bundle, which not proving ſo good as he expected, he ſold it ſo as to loſe 6l. per Cent by it; what was the ſelling Price?

8. If I buy Tobacco at 12 Guineas per cwt. at what Rate muſt I ſell it per cwt to gain 15l per Cent?

9. A Stationer ſold Quills at 11s. per thouſand by which he cleared 60l. per cent; but, they growing ſcarce, he raiſed them to 13s 6d per thouſand, what was his gain per cent by the latter Price?

10. If when I ſell Cloth at 8s. 9d. per yard I gain 12l. per cent what will be the gain per cent when it is ſold for 10s. 6d. per yard?

11. If a Plumber gain 12l. 10s. per cent when Lead is ſold at 20l. 9s. 6d. a Fother what would he gain or loſe per cent, when it is ſold only at 17l. 1s. 3d. the Fother?

12 A Merchant ſold 5 tons 3 hogſheads 53½ gallons of Wine at 6s. 8d. per gallon, and by ſo doing gained 6¼l. per cent. What was the Prime coſt of his Wine, and what did he gain in the whole?

13. If I ſell 500 Deals at 15d. a Piece and 9l. per cent loſs, what do I loſe by the whole Quantity?

14. Bought 60 Reams of Paper at 15s. per Ream, by the Sale of which I loſt 4l. per cent, what did I loſe in the whole ?

BARTER.

WHERE Merchants or Tradeſmen exchange one Commodity for another it is called *Bartering*; and by the Rule of Proportion or Practice, the Price and Quantity of the Goods ſo exchanged are determined, ſo that neither Party may ſuſtain a Loſs by ſuch Traffic.

EXAMPLES.

1. A would exchange 400 Gallons of Jamaica Rum worth 7s. 9d. per Gallon, with B for London Porter at 9d a Gallon ; how many Gallons of Porter muſt A receive of B in exchange for his Rum ?

2. A Hop-factor A exchanged 5 cwt. 1qr. 20lb. of Hops at 2s. 4¼d. per lb. for Wheat at 5s. 9d. per Buſhel, with a Farmer B ; what Quantity of Wheat did B give A for his Hops ?

3. A and B bartered: A had 14 cwt. 3qrs. of Sugar worth 1l. 17s. per cwt. which he bartered for Wine worth 3s. 9d. per Gallon : how much Wine did A receive ?

4. A has 700 Gallons of Rum at 4s. 6d. per Gallon for which B gives him 27 Guineas in Money, and the reſt in Cotton at 11½d. per lb. how much Cotton muſt A receive?

5. A has 27 cwt. of Cheeſe, worth 1l. 11s. 4d. per cwt. and B hath 25 Pieces of Cloth, worth 1l. 19s. 10½d. per Piece; ſhould theſe Perſons trade together, to whom will the Balance (if any) be due?

6. A gave B 120 yards of Kerſey, 3½ yards of which coſt 15s. 9d. for Stockings at 7s. per Pair, and Hats at 6s. 6d. each; B gave A as many Hats as Pairs of Stockings; how many of each did he give?

ALLIGATION.

WHEN different ſorts of Wine, Coin, Spirits, Metals, &c. or any Number of Simples of different Qualities are required to be mixed together, the Method of proportioning ſuch a Mixture is called Alligation, from the Quantities being generally linked or joined together by curve Lines.

PROP. 1

Given the particular Quantities mixed and their reſpective Rates or Prices to find the mean Rate or Price of the Compound.

RULE.

RULE.

Multiply the Quantities of the Mixture by the reſpective Rates or Prices, reduced to one Denomination and divide the Sum of the Products by the Sum of the Quantities, the Quotient will be the mean Rate.

PROP. 2

Given the Rates of ſeveral Ingredients to find the Quantities thereof, ſo that the Mixture may be ſold at a given Rate or Price.

RULE 1.

Reduce the particular Rates to the ſame Denomination as the mean Rate; write them orderly under each other, beginning with the greateſt, and place the mean Rate to the left Hand of them. Then connect the ſimple Rates together ſo that each Rate *leſs* than the mean may be coupled with *one* greater, or with *each* greater; and each Rate *greater* than the mean with *one* leſs, or with *each* leſs.

RULE 2.

Take the Difference between each ſimple Rate and the mean Rate, and place it *alternately*; that is againſt the Rate with which it is linked. Then, if only one Difference ſtands againſt any Rate, it will be the Quantity belonging to that Rate; but if there be ſeveral their Sum will be the Quantity.

PROP. 3

Given the Rates or Prices of ſeveral Ingredients, the Quantity of one and the mean Rate to find the ſeveral Quantities of the reſt in Proportion to that given.

RULE.

Take the Difference between each Rate and the mean as before. Then, as the Difference ſtanding againſt the Price of the given Quantity is to *that* Quantity, ſo are the ſeveral other Differences, to their reſpective quantities.

PROP. 4

Given the Rates or Prices of ſeveral Ingredients, and the whole Quantity of the Mixture, to find the particular Quantities of each Sort.

RULE.

Take the Difference between each Rate and the mean as before. Then as the Sum of theſe Differences is to the whole Quantity of the Mixture ſo is each particular Difference to its reſpective Quantity.

EXAMPLES.

1. A Vintner would mix 2 Gallons of Wine, at 14s. per Gallon with 1 Gallon at 12s. 2 Gallons at 9s. and 4 Gallons at 8s. per Gallon. What will be the worth of a Gallon of this Mixture?

2. A Grocer would mix 4 cwt. of Sugar at 2l. 18s. per cwt. 7 cwt. 2qr. at 2l. 13s. per cwt. 5 cwt. 1qr. at 1l. 13s. per cwt. 5 cwt. 1qr. at 1l. 19s. per cwt. and 9 cwt. 3 qr. at 2l. 14s. per cwt. together, what is the worth of a cwt. of this Mixture.

3. A Vintner would mix four Sorts of Wine of different Prices together, viz. at 14s. 12s. 9s. 8s. per Gallon ; what Quantity of each Sort muſt he put into the Compound that he may be enabled to ſell it at 10s. per Gallon ?

4. A Grocer wiſhes to mix Sugar at 4d. 6d. and 10d. per lb. ſo that he may ſell the Mixture at 8d. per lb. what Quantity of each may he take ?

5. A Merchant propoſes to mix four Sorts of Wine together, vix. 2 Gallons of one Sort at 14s. per Gallon with others at 12s. 9d. and 8s. per Gallon ; how many Gallons of each Sort muſt he take to make a Compoſition worth 10s. per Gallon ?

6. A Diſtiller would mix 80 Gallons of Brandy, at 12s. per Gallon with another Sort at 7s. and a third at 4s. per Gallon ; what Quantity of each Sort muſt he take to make a Compoſition worth 8s. per Gallon ?

7. A Merchant propoſes to mix four Sorts of Wine; the beſt at 14s. per Gallon, the ſecond at 12s. the third at 9s. and the fourth at 8s. per Gallon ; how many of each will make a Mixture of 12 Gallons worth 10s. per Gallon ?

[illegible] A Grocer would mix four Sorts of Sugar, viz. at 2s. 1s. 8d. 1s. and 8d. per lb. what Quantity of each muſt he take to make a Compoſition of 72lb. at 1s. 4d. per lb?

EXCHANGE.

BY Exchange is meant the Bartering or Exchanging of the Money of one Place for that of another by Means of an Inſtrument in Writing, called a Bill of Exchange; conſiſts in finding what Quantity of the Money of one City or Country will be equal to any given Sum of another according to a given Courſe of Exchange.

2. The Courſe of Exchange is the Value agreed upon by Merchants or their Factors; and is continually fluctuating above or below the Par of Exchange, according as the Demand for Bills is greater or leſs.

3. The Par of Exchange is that Quantity of the Money of one Country which is intrinſically equal to a certain Quantity of the Money of another, whether real or imaginary.

4. The real Money of every Empire, Kingdom, State, &c. ſignifies one Piece or more, of any Kind of Metal, coined by the Authority of that State, &c. and current at a certain Value by Virtue of ſuch Authority.

5. The imaginary Money is uſed in keeping Accounts and includes all the Denominations which are uſed to expreſs any Sum of Money of which no ſuch Species are current in any Empire, Kingdon, State, &c.

6. The Agio denotes the Difference in Foreign Countries between the Current or Caſh Money, and the Exchange or Bank Money, the latter being Compounded of a finer, or purer Metal than the former.

7. Bank Notes in the Buſineſs of Exchange, are ſuch as are obtained from Foreign Bankers for Money lodged in their Bank. Theſe are called Bank Money.

8. Uſance is a certain Space of Time allowed by one Country to another for the Payment of Bills of Exchange. It varies according to the Cuſtom of the Country and frequently in Proportion to the Diſtances of Places from each other. Bills are either payable at Sight, or ſo many Days after Sight; at Uſance, double Uſance or half Uſance.

9. The Days of Grace are a certain Number of Days allowed for the Payment of Bills of Exchange, after the Expiration of the Term ſpecified in ſuch Bills, and are variable in different Countries. In ſome Countries no Days of Grace are allowed.

The Neceſſary TABLES of EXCHANGE.

I. DENMARK, ZEALAND, NORWAY, &c.

At Copenhagen, Elſinore, Bergen, Drontheim &c.

The loweſt Price of Money is a Skilling Value $\frac{9}{16}$d. Sterling.

6 Skillings	*make*	1 Duggen.
16 Skillings	-	1* Marc.
20 Skillings	-	1 Rix-Marc.
24 Skillings	-	1 Rix-ort.
4 Marcs	-	1 Crown.
6 Marcs	-	1 Rix-dollar.
11 Marcs	-	1 Ducat.
14 Marcs	-	1 Hall-ducat.

The Danes exchange by the Rix-dollar, Value 4s. 6d. Sterling; but the Courſe of Exchange varies from 45d. to 58d. Sterling per Rix-dollar.

II. SWEDEN, LAPLAND.

At *Stockholm*, *Upſal*, *Tornea*, *&c.*

The loweſt Piece of Money is a Runſtic. Value $\frac{7}{36}$d. Sterling.

2	Runſtics	*make*	1 Stiver.
8	Runſtics	-	1 Copper Marc.
3	Copper Marcs	-	1 Silver Marc.
4	Copper Marcs	-	1 Copper Dollar.
9	Copper Marcs	-	1 Caroline.
3	Copper Dollars	-	1 Silver Dollar.
3	Silver Dollars	-	1 Rix-dollar.
2	Rix-dollars	-	1 Ducat.

The Swedes exchange by the Copper Dollar, value 6 $\frac{2}{9}$d. Sterling, but the Courſe of Exchange is ſubject to great variations.

III. MUSCOVY, or RUSSIA.

At *Moſcow*, *Peterſburg*, *Archangel*, *&c.*

The loweſt Piece of Money is a Poluſcar value $\frac{27}{2000}$. Sterling.

2	Poluſcas	*make*	1 Denuſca.
2	Denuſcas	-	1*Copec.
3	Copecs	-	1 Altin.
10	Copecs	-	1 Grivenir.
25	Copecs	-	1 Polpotin.
2	Polpotins	-	1 Poltin.
2	Poltins	-	1 Ruble.
2	Rubles	-	1 Xewonitz.

The Ruſſians exchange by the Ruble, value 4s. 6d. the Rubles are converted into Florins Current of Amſterdam and the Current into Bank Money, and thence into Sterling according to the Courſe of Exchange between England and Amſterdam. Sometimes they Exchange directly with London from 4s to 5s. per Ruble.

IV. LIVONIA. A Ruſſian Province.

At *Riga, Revil, Narva, &c.*

The loweſt Piece of Money made uſe of is a Blacken, value $\frac{7}{90}$d Sterling.

6	Blackens	*make* 1	Groſhen.
9	Blackens	- 1	Vording.
2	Groſhen	- 1	Whiten.
6	Groſhen	- 1	Marc.
30	Groſhen	- 1	Florin.
3	Florins	- 1	*Rix-dollar.
18	Marcs	- 1	Albertus.
64	Whiten	- 1	Copper-plate dollar.

V. POLAND and PRUSSIA.

At *Cracow, Warſaw, &c. Dantzic, Kehingſberg, Elbing, Thorn, &c.*

The loweſt Piece of Money made uſe of is a Shelon, value $\frac{7}{45}$d Sterling.

3 Shelons	*make*	1 Groſhen or Groſh.
5 Groſhen	-	1 Couſtic.
3 Couſtics	-	1 Tinfe.
18 Groſhen	-	1 Ort.
90 Groſhen	-	1 Florin.
3 Florins	-	1*Rix-dollar.
8 Florins	-	1 Ducat.
5 Rix-dollars	-	1 Frederic d'or.

Dantzic, &c. exchange by the Groſh, with London by the way of Amſterdam, 270 Groſh being equal to 1 Pound Flemiſh.

VI. GERMANY.

At *Hamburgh, Alteno, Lubec, Bremen, &c.*

The loweſt Piece of Money is a Tryling value $\frac{1}{128d}$ Sterling.

2 Trylings	*make*	1*Sexling.
2 Sexlings	-	1 Fening.
12 Fenings	-	1 Shilling Lub.
16 Shilling Lub.	-	1*Marc.
2 Marcs	-	1 Stet Dollar.
3 Marcs	-	1 Rix-dollar.
6¼ Marcs	-	1 Ducat.
120 Shilling Lub	-	1*Pound Flemiſh.

Lubs is a Term derived from the City of Lubec, where the Shillings or Sols Lubs are coined.

Theſe Places Exchange either by the Rix-dollar, Slet-dollar or Marc.

At *Frankfort, Nuremberg, Wureſburg, &c.*

The loweſt Piece of Money in uſe is a Fening, value $\frac{1}{60d}$ Sterling.

4	Fenings	*make*	1 Creuitzer.
3	Creuitzers	-	1 Keyſer Groſs.
4	Creuitzers	-	1 Batzen.
15	Creuitzers	-	1 Ort Gold.
60	Creuitzers	-	1 Gould.
90	Creuitzers	-	1*Rix-dollar.
2	Goulds	-	1 Hand dollar.
4	Goulds	-	1 Ducat.

Theſe Places Exchange by the Gould Guilder, or Florin, and Rix-dollar.

VII. The SEVEN UNITED PROVINCES.

At *Amſterdam, Rotterdam, Leyden, Middleburg, Fluſhing, &c.*

The loweſt Piece of Money in uſe is a *Fenings value $\frac{21}{320d}$ Sterling.

8	Penings	*make*	1*Grot.
2	Grots	-	1 Stiver.
6	Stivers	-	1 Scalen.
20	Stivers	-	1 Guilder.
2½	Guilders	-	1*Rix-dollar.
6	Guilders	-	1*Pound.

VIII. The AUSTRIAN NETHERLANDS.

At *Gent*, *Oſtend*, *&c.* *Antwerp*, *Bruſſels*.

The loweſt Piece of Money in uſe is a Pening, value $\frac{9}{160d}$ Sterling.

4	Penings	*make*	1 Urcher.
8	Penings	-	1*Grot.
2	Grots	-	1 Petard.
6	Petards	-	1 Scalin.
7	Petards	-	1 Scalin.
40	Grots	-	1 Florin.
17½	Scalins	-	1 Ducat.
6	Florins	-	1*Pound Flemiſh.

IX. The FRENCH NETHERLANDS.

At *Dunkirk*, *St. Omer*, *Boulogne*, *&c.*

The loweſt Piece of Money is a Denier, value $\frac{1}{24}$ Sterling.

12	Deniers	*make*	1 Sol.
15	Deniers	-	1 Petard*.
15	Sous or Sols	-	1 Piette*.
20	Sols	-	1 Livre Tournois*.
3	Livres	-	1 Ecu of Exchange.
24	Livres	-	1 Louis d'or.
24	Livres	-	1 Guinea.
30½	Livres	-	1 Moeda.

At *Liſle, Cambray, Valenciennes, &c.*

A *Piette make 15 Petards and is worth 9¾d. Sterling; and 20 Petards make a Florin value 1s. 0½d. alſo 10½ Livres Tournois make a Ducat, value 9s. 3d.

X. FRANCE.

At *Paris, Rouen, Bourdeaux, Bayonne, Marſeilles, Lyons, &c.*

The loweſt Piece of Money in uſe is a Denier, value $\frac{1^d}{24^d}$ Sterling.

3	Deniers	*make*	1 Liard.
2	Liards	-	1 Dardene.
12	Deniers	-	1 Sol.
20	Sols	-	1*Livre Tournois.
3	Livres	-	1 Ecu of Exchange.
6	Livres	-	1 Ecu.
10	Livres	-	1*Piſtole.
24	Livres	-	1 Louis d'or.

Tournois is a Term of the ſame Import in France as Sterling in England.

XI. SPAIN.

At *Madrid, Cadiz, Seville, &c.*

They reckon by the new Plate; and the loweſt Piece of Money is a Maravedi worth $\frac{43}{272d}$ Sterling.

2	Maravedies	*make*	1 Quartil.
24	Maravedies	-	1 Rial.
2	Rials	-	1 Piſtarine.
8	Rials	-	1*Piaſtre of Exchange.
10	Rials	-	1 Dollar.
375	Maravedies	-	1*Ducat of Exchange.
32	Rials	-	1 Piſtole of Exch.
36	Rials	-	1 Piſtole.

At *Gibralter*, *Malaga*, *Denea*, *&c.*

They reckon by the Money of Veillon, a Maravedie of which is worth $\frac{12}{\text{[illegible]}}$ Sterling.

2	Maravedies	*make*	1 Ochavo.
4	Maravedies	-	1 Quartil.
34	Maravedies	-	1*Rial Veillon.
15	Rials	-	1*Piaſtre of Exch.
512	Maravedies	-	1 Piaſtre.
60	Rials	-	1 Piſtole of Exch.
2048	Maravedies	-	1 Piſtole of Exch.
70	Rials	-	1 Piſtole.

At *Barcelona*, *Saragoſſa*, *Valencia*, *&c.*

They reckon by the old Plate; a Maravedie of which is worth $\frac{27}{128d}$ Sterling.

16	Maravedies		*make*	1 Soldo.
2	Soldos	-	-	1 Rial.
16	Soldos	-	-	1*Dollar
60	Soldos	-	-	1 Piſtole.

XII. PORTUGAL.

At *Liſbon, Portugal, &c.*

The loweſt Piece of Money made uſe of is a *Re; value $\frac{27}{400d}$ Sterling.

10 Rez	*make*	½ Vintin.
20 Rez	-	1 Vintin.
5 Vintins	-	1 Teſtoon.
4 Teſtoons	-	1 Cruſade of Exch.
24 Vintins	-	1 New Cruſade.
1000 Rez	-	1*Milre.
48 Teſtoons	-	1 Moidore.
64 Teſtoons	-	1 Ioaneſe.

XIII. ITALY.

The *Republic* of *Genoa*, and the *Iſland* of *Corſica*, containing the *Towns* of *Genoa, &c. Baſtia, &c.*

The loweſt Piece of Money made uſe of in theſe Places is a Denarii, Value $\frac{42}{1200d}$ Sterling.

12 Denarii	*make*	1 Solidi.
20 Solidi	-	1*Livre.
5 Livres	-	1 Croiſade.
5¼ Livres	-	1 Pezzo of Exch.

Some

Some Merchants in Genoa keep their Accounts in Pezzos, Solidi, and Denarii; others in Livres, Solidi, and Denarii.

At *Florence*, *Leghorn*, *&c.*

In Tuſcany; the loweſt Piece of Money in uſe is a Denarii, value $\frac{5}{144}$d Sterling.

4	Denarii	*make*	1 Quatrini.
12	Denarii	-	1 Solidi.
20	Solidi	-	1*Livre.
6	Livres	-	1 Piaſtre of Exch.
7½	Livres	-	1 Ducat.
22	Livres	-	1 Piſtole.

At *Venice*, *Bergamo*, *&c.* in the *Republic* of *Venice.*

The loweſt Piece of Money in uſe is a Picoli, value $\frac{1}{30}$d Sterling.

12	Picoli	*make*	1 Solidi.
6½	Solidi	-	1*Groſs.
20	Solidi	-	1*Lire.
124	Solidi	-	1 Ducat Current.
24	Groſs	-	1*Ducat of Exch.
54	Solidi	-	1 Teſtoon.

XIV. TURKEY, and the LEVANT, viz.

The Morea, the Iſlands of Candia, Cyprus, &c.

The loweſt Piece of Money uſed in theſe Places is a Mangar, value $\frac{3}{20d}$ Sterling.

4	Mangars	*make*	1*Aſper.
3	Aſpers	-	1 Parac.
5	Aſpers	-	1 Beſtic.
10	Aſpers	-	1 Oſtic.
20	Aſpers	-	1 Solota.
80	Aſpers	-	1*Piaſtre.
100	Aſpers	-	1 Caragrouch.
10	Solotas	-	1 Xeriff.

XV. IRELAND.

Dublin, Cork, Londonderry, &c.

The Iriſh Farthing is worth only $\frac{3}{13d}$ Sterling

2	Farthings	*make*	1 Halfpenny.
2	Halfpence	-	1*Penny.
6½	Pence	-	½ a Shilling.
12	Pence	-	1*Shilling Iriſh.
13	Pence	-	1 Shilling.
65	Pence	-	1 Crown.
20	Shillings	-	1 Pound Iriſh.
22¾	Shillings	-	1 Guinea.

⁎ For an Engliſh Shilling a Perſon in Ireland will receive 13d. Engliſh; and for a Guinea 22s. and 9d.

XVI

XVI. The CONTINENT of AMERICA.

The Colonies of Nova Scotia, New-England, Virginia, &c.

In the American Colonies Accounts are kept in Pounds, Shillings and Pence, as in England, and their Money is called Currency. The Scarcity of Caſh obliges them to ſubſtitute a Paper Currency, and the Courſe of Exchange varies in Proportion to the Scarcity of Money.

XVII. The WEST INDIA ISLANDS.

Jamaica, Barbadoes, &c.

A *halfpenny in Jamaica, &c. is worth only $\frac{57}{260}$d Sterling.

2	Halfpence	*make*	1*Penny.
7½	Pence	-	1 Bit.
12	Pence	-	1*Shilling.
75	Pence	-	1 Dollar.
7	Shillings	-	1 Crown.
20	Shillings	-	1 Pound.
24	Shillings	-	1*Piſtole.
30	Shillings	-	1 Guinea.

NOTE. *The imaginary Money is marked with an Aſteriſm*

PROP

PROP.

To reduce the Currency of any State into Bank or Sterling Money, and the contrary.

RULE.

As 100 with the Agio or Exchange added to it, is to 100l. ſo is any given Sum Current to its Value in Bank or Sterling Money, and as 100 is to 100 with the Agio or Exchange added to it ſo is any given Sum of Bank or Sterling Money to its Value Current.

PROP.

To determine the Gain or Loſs per cent by the different Courſes of Exchange with Places that Exchange by the Pound Sterling or with Places that Exchange for a variable Number of Pence Sterling.

RULE.

If the Gain or Loſs per cent be conſidered with Reſpect to the Par of Exchange, ſay, as the Par of Exchange is to 100l. ſo is the given Courſe of Exchange to a fourth Number; which if greater than 100l. the Exceſs will be the Gain; but if leſs than 100l. the Defect will be the Loſs per cent; but if the Gain or Loſs per cent be conſidered with Reſpect to any other Courſe of Exchange, ſay,

ſay, as the given Courſe of Exchange is to 100l. ſo is the propoſed Courſe of Exchange to a fourth Number, which if greater than 100l. the Exceſs will be the Gain: but if leſs, the Defect will be the Loſs per cent.

EXAMPLES.

1. A Merchant at Amſterdam is poſſeſſed of 3750 Guilders 10 Stivers Currency, which he wiſhes to turn into Bank Money, the Agio at $4\frac{1}{4}$ per cent, what will be the Value in Guilders Banco?

2. If the Agio between the Current and Bank Money of the united Provinces be $4\frac{7}{8}$ per cent, how many Guilders Current will be equal to 3093 Guilders 5 Stivers 13 $\frac{149}{167}$ Penings Banco?

3. In 7570 Guilders 15 Stivers Current, how many Rix-dollars Banco, Agio $4\frac{7}{8}$ per Cent?

4. The Agio of Venice is 20 per cent how much Current Money of Venice will be equal to 790 Ducats Bank?

5. In 127l. 3s. 4d. Sterling, how many Hamburgh Marcs, &c. Exchange at $32\frac{1}{4}$ Sols Groſs or 2328 Fenings, per L. Sterling?

6. In 475l. 18s. Sterling, how many Marcs, &c. Exchange at 36s. 6d. Flemiſh per L. Sterling?

7. If I pay 757l. 18s. 7d. in London what muſt I draw my Bill for on Amſterdam, Exchange at 1l. 15s. 9d. Flemiſh per L. Sterling ?

8. If I pay in London 754l. 11s. 9d. Sterling, how many Guilders, &c. may I draw for at Amſterdam, Exchange at 34 Scalins 4¼ Grots per L. Sterling ?

9. In 547l. 19s. 10d. Sterling, how many Copper Dollars of Sweden, Exchange, at 47½ Copper Dollars per L. Sterling ?

10. Reduce 1541 Marcs 14 Sols Lub. 4 Fen. Bank-money of Hamburgh, into Sterling, Exch. at 32¾ Sols groſs per L. Sterling, 72 Fenings being equal to 1 Sol groſs.

11. In 1788 Rix-dollars 21 Sols Lub, how many Pounds Exch. at 34½ Sols groſs per L. Sterling ?

12. Remitted from Amſterdam to London a Bill of 1747l. 14s. 7d. Flemiſh, how many Pounds Sterling is the Sum, Exch. at 34s. 7d. Flemiſh per L. Sterling ?

13. In 7123 Copper Dollars 14 Runſtics, how many Pounds Sterling, Exchange at 48½ Copper Dollars per L. Sterling ?

14. In 747l. 18s. 10d. Sterling, how many Rix-dollars of Denmark Exchange at 47d. Sterling per Rix-dollar ?

15. In 7574l. 19s. Sterling, how many Ruſſian Rubles, &c. Exchange at 4s. 7d. Sterling per Ruble ?

16. In 3819 Rix-dollars 1 Marc $10\frac{\text{[illegible]}}{47}$ Skillings of Denmark, how much Sterling Money Exchange at 47d. Sterling per Rix-dollar?

17. In 7454 Rub. 4 Griv. 6 Cop. how many L. Sterling, Exch. at 4s. 9d. per Ruble?

18. In 4759 Rubles 44 Cop. Exch. at 124 Copecs per Rix-dollar Current at Amſterdam, Agio $3\frac{1}{2}$ per cent, how much Sterling Money? The Exchange between Amſterdam and London being 34s. 6d. Flemiſh per L. Sterling.

19. In 7947 Florins of Dantzick Exchange at 270 Groſhen per L. Flemiſh and 33s. 5d. Flemiſh per L. Sterling, how much Sterling Money?

20. In 749l. 17s. 6d. Sterling, how many Rix-dollars, &c. Exch. at 274 Groſhen per L. Flemiſh and 34s. 8d. per L. Sterling?

21. In 636 Livres Tournois 3 Sols $9\frac{1}{2}$ Deniers, how many Pounds Sterling, Exchange at $31\frac{1}{2}$d. per Ecu of 3 Livres?

22. A Bill of 759l. 18s. 9d is remitted to Paris by a Merchant in London, what is the Value in French Crowns, at 54d. per Ecu?

23. In 749l. 18s. Sterling, how many Piaſtres or Pieces of Eight, at Madrid Exch. at $45\frac{3}{8}$d. Sterling per Piaſtre?

24. In 9749 Rials of Plate, how many L. Sterling, Exch. at $43\frac{3}{8}$d. per Piaſtre?

25. In 7434 Cruſades 347 Rez, how many L. Sterling, Exch. at 65d. per Milre ?

26. If a Bill of 1788l. 17s. Sterling be drawn upon London, what is the Value at Oporto in Milrez, Exchange at 66½d. per Milre ?

27. How much Sterling Money may a Perſon receive in London if he pay in Genoa 947 Dollars Exchange at 53½d. per Dollar ?

28. London is indebted to Genoa 1749l. 17s. 6d. for how many Pezzos may Genoa draw on London, Exchange at 47¼d. per Pezzo.

29 London remits to Ireland 574l. 15s. Sterling, how much Currency of Ireland muſt be received Exch. at 7l. 10s. per cent.

30. London receives a Bill of Exchange from Carolina for 917l. 18s. Sterling; for how much Currency was London indebted, Exchange at 76 per cent ?

31. What muſt be paid in London for a Remittance of 6747l. 14s. Iriſh, Exch. at 11¼ per cent ?

32. London draws upon Holland for a Sum of Money when the Exchange is at 35s. 6d. Flemiſh per L. Sterling, and afterwards draws again when the Exchange is at 34s. 6d. what does London gain or loſe per cent by this Negotiation when compared with the former ?

33. If the Par of Exchange between London and Amſterdam be 37⅛ Flemiſh per L. Sterling what does London gain or loſe per cent by drawing Bills upon Holland at 33s. 3d. Flemiſh per L. Sterling?

34. The Par of Exchange between London and Portugal is 5s. 7½d. Sterling per Milre; what is gained or loſt per cent, when the Courſe of Exchange is 5s. 2½d. per Milre?

ARBITRATION of EXCHANGE.

BY Arbitration, or the Compariſon of Exchange, is to be underſtood a Method of remitting to or drawing upon Foreign Places in ſuch a Manner as ſhall be moſt advantageous to the Merchant.

SIMPLE ARBITRATION.

WHEN the Exchanges among three Places *only* are concerned it is called *ſimple* Arbitration and the *arbitrated* Price is ſuch a Rate of Exchange between two of the Places as ſhall be in Proportion with the Rates aſſigned between each of them and a third.

EXAMPLES.

35. When London Exchanges with Paris at 31½d. Sterling per Ecu, or Crown, and with Amſterdam at 34s. 8d. Flemiſh per L. Sterling; what ought the Courſe of Exchange to be between Paris and Amſterdam, that a Merchant in London may remit a Sum of money to Amſterdam by way of Paris, without Loſs?

36. If Amſterdam Exchange with London at 33s. 7d. per L. Sterling, and with Liſbon at 51½d. Flemiſh for the Cruſade of 20 Vintins or 4 Teſtoons, how ought the Exchange to go between London and Liſbon?

37. A Merchant in London is deſirous of transferring a Sum of Money to Amſterdam in the moſt Advantageous Manner, either directly to Amſterdam or through Paris, at a Time when the Courſe of Exchange between London and Amſterdam is 34s. 5d. per L. Sterling and between London and Paris 31¼d Sterling per Crown: by Advice, he finds the Courſe of Exchange between Paris and Amſterdam to be 52d. Flemiſh per Crown, upon which he remitted directly to Amſterdam, and draws for the Value upon Paris, what does he gain per cent by theſe Means; and what would he have loſt per cent, had he remitted the Money to Amſterdam by way of Paris, and then drawn for the Value upon Amſterdam, ſuppoſing he had received no Advice of the Courſe of Exchange between Paris and Amſterdam?

38. A Spaniſh Merchant ordered his Factor in London to remit the Value of 900 Ducats to Venice at 50¼d. per ducat, and to draw upon him at Madrid for the Value at 41d. per Piaſtre, when the Order arrived, the Exchange at Venice was at 51d. per Ducat and at Spain at 42¼d. per Piaſtre, whether did the Merchant gain or loſe by this Negotiation ?

COMPOUND ARBITRATION of EXCHANGE.

COMPOUND Arbitration has Reſpect to the Exchanges of four or more Countries or Cities ; and its Utility conſiſts in diſcovering the beſt and moſt advantageous Method of Negotiating Exchange with different Places.

PROP.

To determine whether a direct or circular Exchange will be Preferable.

RULE.

Diſtinguiſh the ſeveral Courſes of Exchange into Antecedents and Conſequents : Place the Antecedents in one Column, and the

Con-

Conſequents in another to the right Hand of the Antecedents, in ſuch a Manner, that the firſt Conſequent may be of the ſame Name and Denomination as the ſecond Antecedent, and the ſecond Conſequent, as the third Antecedent, &c. through the whole. Then multiply all the Antecedents together for a Diviſor, and all the Conſequents together for a Dividend ; the Quotient will be the Value of the Sum required. Then calculate the Value of the Sum by the direct Exchange, or by any other circular Exchange and by comparing theſe Values together, may be ſeen which will be the moſt advantageous.

EXAMPLES.

39. Sold Goods to a Houſe in Amſterdam to the Amount of 824l. Flemiſh, which my Correſpondent adviſes me he will remit; but as the Exchange on Amſterdam was ſo low as 34s. 4d. per L. Sterling, I have deſired him to remit it to France at 48d. Flemiſh per Crown ; thence to be remitted to Vienna at 100 Crowns for 60 Ducats, thence to Hamburgh at 100d. Flemiſh per Ducat ; thence to Liſbon, at 50d. Flemiſh per Cruſade of 400 Rez ; and laſtly from Liſbon to England at 5s. 8d. Sterling per Milre, whether ſhall I gain or loſe by the circular Exchange ?

40. A Merchant of London has Credit at Leghorn for 7547 Piaſtres, whence he receives Advice that a Remittance can be made at 42d. per Piaſtre; the Merchant upon this Orders them to be remitted to Venice at 95 Piaſtres for 100 Ducats Banco; thence to Cadiz at 321 Maravedis per Ducat; thence to Liſbon at 631 Rez per Piaſtre; thence to Amſterdam at 50d. Flemiſh per Cruſade; thence to Paris at 56d. Flemiſh per Ecu; and laſtly from Paris to London at 31½d. per Crown, what ought to be the Arbitrated Price between London and Leghorn; whether will the Merchant gain or loſe, and how much per Cent by the circular Exchange?

41. I have ordered my Factor at Amſterdam to remit 1757l. 15s. Flemiſh, (the Exchange between London and Amſterdam being 34s. 7d. Flemiſh per L. Sterling) to France at 54d Flemiſh per Ecu; thence to Venice at 100 Crowns for 56 Ducats Banco; thence to Hamburgh at 100d. Flemiſh per Ducat; thence to Portugal at 45d. Flemiſh per Cruſade; and thence to London at 63d. per Milre; how much Sterling Money ought I to receive, allowing my Factor ½ per cent Commiſſion at each Place and whether will be the more advantageous, the circular or the direct Exchange?

The following Bills, &c. are to exerciſe Commiſſion, Diſcount, &c.

1. London, 1793.

Mr. Benning,

To E. Dowſon, Dr.

Jan. 9. For transferring 1749l 17s 8d
Bank Stock, Com. $2\frac{7}{8}$s per cent l.
12. For transferring 2176l 7s 6d three
per cent Conſols, Com. $2\frac{1}{8}$s per cent
Feb. 1. For transferring 954l 18s South
Sea Stock, Com. $6\frac{1}{4}$s per cent
8. For laying out 192l 10s 2d in
Silks, Com. $2\frac{3}{8}$l. per cent
12. For laying out 551l 18s 9d in
Cotton, Com. $2\frac{7}{8}$l per cent
20. For laying out 789l 17s in
Callicoes, Com. $3\frac{1}{8}$l. per cent

£.

2. Birmingham March 1ſt, 1793.

Mr. Middleton,

Bought of G. Wilſon.

70 Groſs of Buttons, at 18s 6d per Groſs,
to pay at 10 Months
140 Dozen of Knives, at 9s per Dozen
to pay $\frac{1}{2}$ at 4 and $\frac{1}{2}$ at 6 Months
27 Dozen of Metal Buckles at 1l 12s per
Dozen and 10 Dozen of plated ditto
at 1l 14s per dozen to pay at 20 Days

£.

If Mr. Wilſon allow Mr. Middleton 5 per cent Diſcount for ready Money what will be the Value of his Bill?

3. Dublin March 2d. 1798.

Invoice of 547 Firkins of Butter and 70 Barrels of Pork, laden by me *James Donegall*, on Board the *Cork*, *Patrick Fitzgerald* Master, for the proper Account and Risk of *Thomas Moore* Merchant in London, under the Mark per Margin, Contents, Costs, and Charges, viz.

547 Firkins of Butter, bought of *James O'Brien*, wt. 56lb. each at 1l. 4s. 7d. per Cwt.

4.
70 Barrels of Pork, bought of *Patrick O'Neille*, at 19s. 4d. Per Barrel.

CHARGES.

	l.	s.	d.
To Custom of the Butter	2	11	0
Ditto of the Pork	1	14	0
For 547 Firkins	15	19	11
Cooperage, Heading, Hoops &c.	8	4	0
For 70 Barrels, Cooperage of do. &c	4	5	0
Lighterage and Whartage	0	17	9
Cartage and Portage	0	19	7
£.			

To my Commission at 2½ per cent, what Sterling Money will this Amount to at 12 *per cent Exchange?*

5. Kingſton, Jamaica, June 5th. 1792.

Invoice of 14 Hogſheads of Tobacco, laden on Board the *Peggy*, *George Panton*, Maſter, conſigned to *James Porter*, Merchant in London for his proper Account and Riſk marked as per Margin; Contents, Coſts, and Charges, viz.

To 14 Hogſheads of the beſt Tobacco, Wt. 84 Cwt. 1qr. 14lb. Tare 2qrs. 4lb. per Hogſhead Trett 4lb. per 104 at 9¼d per lb.

CHARGES.

	l.	s.	d.
For 14 empty Hogſheads	1	8	0
Cooperage, Hoops, &c.	1	1	0
Warehouſe Room	0	17	9
Boatage and Stowage	0	14	5
Charges at Shipping	0	19	4
For my Commiſſion at 3½ per cent			
Errors Excepted £			

What Sterling Money does the above Invoice Amount to, Exchange at 25 per Cent?

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